DOCUMENT RESUME

ED 350 900 HE 025 876

AUTHOR	Loeb, Jane W.
TITLE	Academic Standards in Higher Education. Selective Admission Series.
INSTITUTION	College Board, New York, NY.
REPORT NO	ISBN-0-87447-445-0
PUB DATE	92
NOTE	86p.
AVAILABLE FROM	College Board Publications, Box 886, New York, NY 10101-0886 ($10.95, plus $2.95 postage and handling).
PUB TYPE	Reports - General (140)
EDRS PRICE	MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	*Academic Achievement; *Academic Standards; Access to Education; Admission Criteria; College Bound Students; *College Outcomes Assessment; College Preparation; Curriculum; Educational Assessment; *Educational Quality; Educational Testing; Excellence in Education; *Grading; Higher Education; Minority Groups; Student Evaluation; Undergraduate Study

ABSTRACT

This report explores some of the complexities involved in setting, maintaining, and judging standards in higher education, and examines the interactive effects that the standards of schools and colleges have on each other, with special emphasis on the implications of selective college admission practices. Focus is on whether current standards are really as low as feared and whether local and state attempts to raise them have met with success. The report is organized into four focal points at which the standards within any particular segment of the educational system can be set and evaluated. First, the level of preparation of students when they enter a program determines what kind of curriculum can be offered. Second, what students learn will be determined by what content is offered to them and also by how it is offered. Third, standards are both set and reflected by procedures for judging student progress. Fourth, the level of mastery students have achieved when they are certified as having completed the program is an important indicator of the standards in effect. Additional discussions include college outcomes assessment and the difficulties in their measurement, and the determination of institutional quality. Contains 86 references. (GLR)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED350900

Academic Standards in Higher Education

Jane W. Loeb

NE 025 876

"PERMISSION TO REPRODUCE THIS MATERIAL IN OTHER THAN PAPER COPY HAS BEEN GRANTED BY

The College Board

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

The College Board

BEST COPY AVAILABLE

Academic Standards in Higher Education

Academic Standards in Higher Education

Jane W. Loeb

Associate Vice Chancellor
for Academic Affairs
University of Illinois at Urbana-Champaign

College Entrance Examination Board, New York

The College Board is a nonprofit membership organization committed to maintaining academic standards and broadening access to higher education. Its more than 2,700 members include colleges and universities, secondary schools, university and school systems, and education associations and agencies. Representatives of the members elect the Board of Trustees and serve on committees and councils that advise the College Board on the guidance and placement, testing and assessment, and financial aid services it provides to students and educational institutions.

In all of its book publishing activities the College Board endeavors to present the works of authors who are well qualified to write with authority on the subject at hand and to present accurate and timely information. However, the opinions, interpretations, and conclusions of the authors are their own and do not necessarily represent those of the College Board; nothing contained herein should be assumed to represent an official position of the College Board or any of its members.

Copies of this book may be ordered from College Board Publications, Box 886, New York, New York 10101-0886. The price is $10.95.

Editorial inquiries concerning this book should be directed to Editorial Office, the College Board, 45 Columbus Avenue, New York, New York 10023-6992.

Copyright © 1992 by College Entrance Examination Board. All rights reserved. The College Board, Scholastic Aptitude Test, SAT, and the acorn logo are registered trademarks of the College Entrance Examination Board.

Library of Congress Catalog Number: 92-081297

ISBN: 0-87447-445-0

Printed in the United States of America

BEST COPY AVAILABLE

Contents

Foreword ix
Preface xi
Acknowledgments xii

1. Preparation Level of Entering Undergraduates 1

Test Scores 2
Competency-Testing Programs 4
Proposed Improved Testing Programs 7

High School Curriculum and Course Work 9

2. College Admission Requirements 13

Interaction with Secondary Schools 13
Establishing Admission Requirements 15
Effects on Student Behavior 16

Improving Minority Access to Higher Education 19
Special Admission Policies 20

Conclusions 22

3. The Higher Education Curriculum 25

Conditions in Higher Education 26
Content 26
Coherence 27
Instructional Methods 28

Current State of Reform 32

4. Grading Standards in Higher Education. 35

Achieving Appropriate Grading Standards 36
Statistical Studies of Grading Practices 37
Comparison Among Institutions 38
Comparison Within an Institution 41

5. College Outcomes 45

Difficulties in Measurement of College Outcomes 46
Cognitive Growth 46
Institutional Differences 47

College Graduation 48
Effect of Student Qualifications 48
Other Factors 49

Differences Among Ethnic Groups 51
Conclusions. 52

6. Determination of Institutional Quality 55

Conventional Criteria. 55
Talent Development 56
Resources Required for Excellence in Undergraduate Education . 58
Assessment of Student Outcomes 59

7. Conclusions 63

Effects of Change 64
Minority Groups 65

Outlook for the Future 65

References 69

Foreword

Each year, nearly one and a half million students across the country move directly from secondary school to the more than 3,000 colleges and universities in the nation. In addition, thousands of students enter higher education following a period of work or military service. This process whereby millions of young men and women annually choose, or are chosen by, colleges has been aptly described as "the great sorting."

In 1988, the College Board set out to conduct a comprehensive review of this great sorting—how students are distributed and distribute themselves across the variety of institutions of higher education in the United States—in an effort both to determine the extent to which the process serves the interests of students and institutions and, indeed, of the nation, and to demystify for parents and students the often-bewildering set of admission practices and procedures that mark the transition to college.

With the advice of professionals and experts in counseling, admission, financial aid, curriculum articulation, public policy, and professional associations, the *College Board Study of Admission to American Colleges and Universities in the 1990s* encompasses two series of monographs. The "Selective Admission Series," conceived by our

colleague Fred A. Hargadon, Dean of Admission at Princeton University, and conducted under his leadership, addresses issues with particular implications for the more selective institutions (or, as Dean Hargadon has suggested, "institutions that engage in the process of selecting a class") and for the students who attend them. Recognizing that the majority of college-bound students attend a greater variety of institutions of higher education than those represented in the first group, the "Admission Practices Series" addresses additional issues of importance and concern to the educational community as a whole and the public at large. The two series are closely related and integral to the study.

During its history, the College Board has played an instrumental role in promoting consensus on ways to improve the efficiency, effectiveness, and fairness of the system of admission to college and the processes that surround that system. At a time when the means by which students find their way to particular institutions of higher education are marked with particular complexity, it is fitting that the College Board, as a unique membership association of schools and colleges, attempt to assess the degree to which the system as a whole serves the needs of the parties involved.

We owe special gratitude to the individuals who agreed to take on the task and the challenge of studying various aspects of the "great sorting" and, through these monographs, to describe the intricacies and strengths of our system of college admission.

Donald M. Stewart
President
The College Board

Preface

In the past decade, a great deal has been written about the role of academic standards throughout the educational system. This concern with standards reflects a widespread desire for increased educational quality control and for excellence in education. If we can agree on appropriate standards, then we will be periodically able to evaluate student learning to find out whether the results of the educational process have met those standards. Within higher education, setting and maintaining standards begins at the point of entry, where there has been a noticeable trend toward lower preparation levels of freshmen and an increase in the availability of remedial course work. There is a complex relationship between admission practices and academic standards at every level of study, with the practices of one level affecting and being affected by those which precede and follow it in the educational process. For example, college entrance requirements are a reflection of the degree of preparation of high school students. At the same time, what colleges and universities require affects the curriculum and students' course selection at the high school level. Once students matriculate, how they are taught and what they are taught reflect, in part, their level of preparation. At the same time,

the college curriculum is partially determined by the expectations of graduate and professional schools.

The following monograph is intended to explore some of the complexities involved in setting, maintaining, and judging standards in higher education, and to examine the interactive effects that the standards of schools and colleges have on each other, with special emphasis on the implications of selective college admission practices. The monograph is organized around four focal points at which the standards within any particular segment of the educational system can be set and evaluated. First, the level of preparation of students when they enter a program determines what kind of curriculum can be offered. Second, what students learn will be determined by what content is offered to them and also by how it is offered. Third, standards are both set and reflected by procedures for judging student progress. Fourth, the level of mastery students have achieved when they are certified as having completed the program is an important indicator of the standards in effect.

Acknowledgments

I want to thank Fred Hargadon for his very helpful review of an earlier draft of this paper. Although I alone am responsible for its content, his insights were extremely useful.

1

Preparation Level of Students Entering Higher Education

The overall preparation level of students entering higher education has declined, in part because higher education is serving a larger segment of the population now than in the past. The general preparation level is not only a response to the expectations colleges communicate to schools and students, but also a determining factor in setting college admission requirements and the contents of the curriculum at the entrance level. For example, as student preparation declined, remedial services and lower-level courses became more widely available in colleges and universities. Thus, the precollegiate preparation of students interacts with standards in higher education. Trends in the level of student preparation for college are reflected in both academic test scores and high school course work completed.

Test Scores

Koretz (1986) analyzed a wide variety of test score data in order to investigate trends in student performance. His report documents a widespread, though not universal, decline that began in the middle 1960s, as shown in the Scholastic Aptitude Test (SAT); the American College Test (ACT); the National Assessment of Educational Progress (NAEP); Project Talent, National Longitudinal Study of the U.S. class of 1972 (NLS), and High School and Beyond (HSB); the annual Iowa Assessment of student achievement in grades 3 through 12; and periodic norming data for commercial tests of school achievement.

The Koretz analysis indicates that scores on tests administered in high school tended to display the largest declines; those administered in third grade or below remained constant or showed only small declines. Overall, basic skills seem to have declined less than higher-order skills. At the younger ages, some tests have since returned to, or even exceeded, their previous levels. Recovery has been smaller for tests in the higher grades. For example, the Iowa Test of Basic Skills (ITBS) data indicate that by 1984, grades 3 through 6 had attained their highest scores in the 30 years of available data. Iowa Test of Educational Development (ITED) data show that by 1984, scores in grades 7 through 11 had regained substantial portions of the earlier loss, but had not quite reached their earlier highs, and those of grade 12 were rising, but still low.

Koretz also notes that, in general, scores of black students declined less, stopped declining or began to increase earlier, and increased at a faster rate than those of white students. The recent increase in scores of black students has occurred at about the same rate as the total SAT decline, which is a trend that most observers have considered to be significant. Scores of Hispanic students have also risen recently, relative to those of white students.

Trends in student performance on the NAEP have been widely reported (e.g., Applebee, Langer, and Mullis 1989; Linn and Dunbar 1990; Mullis, Owen, and Phillips 1990). In general, recent results indicate improved performance, especially at the lower levels of achievement. Gaps between black and Hispanic students on one hand, and white students on the other, have been reduced. Students at all three age levels tested—9, 13, and 17—were reading as well as or somewhat better in 1988 than students in 1971. Mathematics perfor-

mance of 9- and 13-year-olds was higher in 1986 than in 1973, but that of 17-year-olds had not fully recovered from earlier declines. By 1986, the science proficiency of 9-year-olds had regained the level it attained in 1970. Science scores of 13-year-olds had not fully rebounded to the 1970 level. Science scores of 17-year-olds remained well below the 1970 level, despite recent gains. At all three ages, the black/white gap has decreased in reading, science, and mathematics. The Hispanic/white gap has also decreased, except in science among 17-year-olds. Even with these gains, however, the average level of 17-year-old black and Hispanic students tends to be closer to that of white 13-year-olds than of white 17-year-olds.

The general level of performance remains disturbingly low, even after recent gains. For example, in 1988, most 17-year-olds (86 percent) could demonstrate reading skills at the level of searching for specific information, interrelating ideas, and making generalizations; fewer than half (42 percent) could find, understand, summarize, and explain relatively complicated information. In the 1986 mathematics exam, only about half (51 percent) of those tested could compute with decimals, fractions, and percentages; recognize geometric figures; and solve simple equations. A very small minority (6 percent) could solve multistep problems using basic algebra. Similarly, on the 1986 science assessment, only 7 percent of 17-year-olds demonstrated the ability to infer relationships and draw conclusions using detailed scientific knowledge.

Performance levels of U.S. students are also disturbingly low compared to those of students elsewhere in the world. For example, *A World of Differences—An International Assessment of Mathematics and Sciences* (Educational Testing Service 1989) indicated that compared to students in Ireland, Korea, Spain, the United Kingdom, and four Canadian provinces, our 13-year-olds were the poorest performers on a mathematics test administered in 1988. Almost all U.S. 13-year-olds demonstrated that they could add and subtract, but only 40 percent could do a two-step problem such as finding the mean of a set of five numbers. Yet 78 percent of Korean students, who performed at the highest levels among those tested, could solve such problems. Performance of U.S. students on a science proficiency exam was also in the very lowest group of countries and provinces. It is painfully clear from these results that we are not currently training enough prescience, premathematics, and preengineering students.

In short, recent increases in test-score averages have overcome

some, but not all, of the earlier declines noted. Most students are learning most basics, and performance of black and Hispanic students is improving at particularly high rates. However, harder tasks are mastered by fewer students than we would hope or expect, and sizable gaps remain between the average performance levels of white and minority students.

Competency-Testing Programs

In response to concern about student performance, a number of competency-testing programs have been introduced in an effort to raise standards as they are reflected in test-score levels. Some of these testing programs have sought to assure minimum student competency for grade promotion or graduation. Others have provided accountability information to the public concerning the performance of schools and school districts. In all, 47 states now require basic skills testing at some point or points between grades 1 and 12 (Coley and Goertz 1990). Of these 47, 38 use test data to monitor performance of students, schools, and/or school districts; 23 require passing a test for grade promotion and/or high school graduation; 20 use test scores to determine students' needs for remediation; 9 use test results in allocating funds for compensatory education. The results of these programs can affect higher education in several ways—most obviously by influencing the size and preparation level of the college applicant pool. In addition, the results of testing programs in elementary and secondary schools can inform us about the likely effects of various possible institutional responses to calls for increased accountability and systematic assessment in higher education.

Perkins (1982) provided a comprehensive review of the goals of and the arguments for and against minimum-competency-testing programs, which set an explicit standard of acceptable performance and enforce it by using test results to determine an important decision, such as promotion or graduation.

The aims of minimum competency and other "high-stakes" testing programs (those that affect important results for individuals, such as graduation) have generally been to restore public confidence in the value of the high school diploma through greater accountability; to increase involvement of the public in education by defining the competencies to be taught, learned, and tested; to improve the educational process by the careful evaluation of curricula to ensure that required

skills are taught; and to provide for diagnosis and remediation of student difficulties.

The risks of these programs include potential harm to minority populations that may have above-average failure rates and to low-achieving students who will be held back or not graduated. High-achieving students may suffer if the curriculum emphasizes minimum competencies at the expense of material of a more challenging nature. The curriculum may suffer additionally through a tendency to focus on relatively trivial skills, in large part because they are testable. A final concern, and one that is especially troublesome when considered from the point of view of higher education, is the locus of control. Statewide mandates for testing and the adoption of statewide objectives and required performance levels may sharply limit local control of the curriculum and of the educational process.

Measurement-driven instruction. Has high-stakes testing improved student outcomes where it has been implemented? Popham (1987) has advocated "measurement-driven instruction," through which instructional programs are influenced by high-stakes tests. Both advocates and critics of measurement-driven instruction agree that high-stakes tests can and do drive instruction. The biggest impact will happen when both stakes and standards, or the required passing level, are high (Airasian 1988). On the other hand, if the passing score for high school graduation is set at the fifth-grade level, instruction won't be affected much for most students.

That measurement-driven instruction can work to improve student performance is suggested by evidence reported by Popham (1987). In Alabama, Connecticut, Detroit, Maryland, New Jersey, South Carolina, and Texas, increased percentages of students achieved designated standards following the introduction of high-stakes testing programs. For example, in South Carolina, the percentage of students showing mastery of reading and mathematics at the required level increased by 12 to 20 percentage points for grades one, two, three, six, and eight over a five-year period. In addition, Popham reports that the performance gap between majority and minority students has diminished in some instances. For example, in Texas, the difference between black and white ninth graders in reading and mathematics scores was reduced by half between 1980 and 1984.

Although these performance increases are encouraging, the extent to which they may overestimate real improvement in achieve-

ment has been questioned. In part, performance gains may reflect teachers' emphasis on the specific content of the high-stakes tests and even on the exact format of items on the tests. If so, students may show smaller or even no gains on other tests covering the same general subject areas. Koretz et al. (1991) investigated the degree to which student performance on high-stakes tests is corroborated by performance on other tests; additional tests of mathematics and reading were given to third graders and the results were compared to student performance on high-stakes tests of the same general content area. The data supported the investigators' hypothesis that performance gains on the high-stakes tests are not necessarily reflected on alternative tests. Indeed, the apparent performance gains—especially in mathematics—seem to have been, in part, the result of specific test preparation, rather than reflecting true achievement increases. Shepard and Dougherty (1991) surveyed teachers in the same districts studied by Koretz et al. (1991) in order to examine test preparation and instructional practices. The results suggest substantial effects of high-stakes testing on instruction. Teachers reported emphasizing basic skills as well as skills and content known to be on the tests. Subjects that are not on the tests—notably science and social science—were given less emphasis. Considerable instructional time was spent preparing students for the tests; for example, students practiced with the item formats used on the tests. In short, high-stakes testing appears to have narrowed the curriculum while producing performance gains that are not confirmed on alternative test instruments.

Performance criteria. Another issue concerning the use of tests in defining or maintaining standards is the determination of cutoff scores—performance criteria for passing. Although we would like to think that performance standards that determine such important matters as high school graduation reflect a real consensus concerning the expected outcomes of education, this is not necessarily the case. Jaeger (1987) summarized research indicating that of the several methods developed to determine cutoff scores, the method chosen affects the results. Minimum-test-score standards, which we would like to view as absolute, vary considerably depending on the method used to develop the standards. Ellwein, Glass, and Smith (1988) studied five sites across the country to discover how and with what consequences minimum-test-score standards are established and concluded that the process was typically more symbolic and political

than genuinely reforming. They found that anticipated failure rates tended to influence the setting of passing scores, especially when agencies setting them must deal directly with the consequences of failure. When cutoff scores were established, "safety nets"—such as allowing students to take the test several times, giving authority to the teacher or an administrator to overrule the test results, and/or lowering the passing score by the standard error of measurement—were put in place. These safety nets essentially allowed organizations to appear to effect strict standards while actually going about business much as before.

Ellwein, Glass, and Smith (1988) found that during the early phases of competency-testing reforms at the sites studied, considerable effort was expended on development of objectives, review of test items, and setting of required passing levels. After initial passing rates were calculated, results received less attention in most cases. Final passing rates—especially those broken down by race—were often lacking. In fact, neither final passing rates nor evaluations of the programs were usually provided. Empirical research on the effects of these programs is very much needed.

Clearly, setting cutoff scores is a matter of judgment. Ellwein and Glass (1989) described one such process in detail, thereby revealing the subjective nature of any cutoff score. The mathematics consultant to a project that established minimum score levels to pass from grade to grade is quoted as saying that the standards are arbitrary, "but not arbitrarily arbitrary" (p. 161). The committee establishing the cutoff scores acknowledged that there is no absolute standard. Other participants reflected as follows: "There's a certain intuitiveness to a standard" (p. 162). The "passing score has to be high enough and number of students failing low enough" (p. 163). The appearance of a cutoff score is important, but it is also important that it have results that are not too devastating for either students or service providers. In short, these studies of standard setting appear to indicate that establishing passing scores is fairly arbitrary and serves largely symbolic purposes.

Proposed Improved Testing Programs

After 10 years of increased reliance on standardized tests to set, communicate, and enforce achievement standards, it is becoming increasingly apparent that there are negative effects associated with

the use of existing tests for relatively high-stakes, accountability purposes. At the same time, performance on examinations can help us monitor how well students and schools are performing, and standards for expected performance can help students understand what is expected of them. Resnick (1991) and Tucker (1991) proposed a kind of national examination system which could resolve the considerable tension that exists between (1) the desire for performance measures that serve motivational and accountability purposes, and (2) concerns about the negative effects that can result from the kinds of high-stakes testing initiated to date. The Resnick/Tucker proposal involves examinations closely tied to the curriculum. Students would be expected to study for them, and teachers would be expected to help students prepare for them. The tests currently in use are typically not directly based on the curriculum; rather, they indirectly reflect students' learning. Thus, students are not expected to study for the tests, and teachers are not expected to engage in direct test-preparation activities.

The new examination system, in contrast, would be a part of the learning and evaluation processes built into the curriculum. Relatively high-level skills would be examined. Evaluation would rely not only on one-time performance examinations, but also on portfolios of student work collected over time and projects on which students had spent substantial time (Linn 1991). The course outlines adopted would be broad enough to allow for local curriculum control and decentralized determination of projects, portfolios, and performance examinations. Different examinations would be calibrated to standards set by a national board.

Through such a system, Resnick and Tucker propose to set high and visible standards for all students. If high school graduation or employment depended upon meeting such standards, all students, not just those who are college-bound, would have an incentive to work hard in school. If additional time and help were provided to students experiencing difficulty reaching the required achievement levels, a common high standard would be feasible (Tucker 1991).

Linn (1991) described the difficult challenges involved in the Resnick/Tucker proposal, including agreeing on course outlines and solving technical difficulties involved in evaluating performance, establishing validity, and calibrating different performance measures. Given these challenges, it seems that the 10 years of research and development proposed are needed; given the potential for educational

improvement offered by the proposed examination system, the effort certainly seems worth undertaking.

High School Curriculum and Course Work

College preparation is heavily affected by the curriculum offered and the courses taken in high school. It can be argued that the curriculum is the major determinant of what is learned. Of the three typical high school curricula—vocational, general, and college preparatory—the last is presumably the most challenging. Yet, by the early 1980s, it had become less demanding as a result of "cafeteria" curricula and electives; a reduced emphasis on academic studies may be one reason for the decline in student performance on the SAT verbal and similar tests (Resnick and Resnick 1985). To counter these trends, most states raised their high school graduation requirements early in the 1980s.

Courses taken in high school are related to test performance, as one would expect. Thus, we might hope to increase students' general level of preparation for college by encouraging more students to select the college-preparatory curriculum and, within it, to elect more challenging courses. In a study of performance on the 1982 NAEP mathematics test, Davis (1986) found that scores were higher among students enrolled in more advanced mathematics courses. The relationship held true for white, black, and Hispanic students. Jones, Davenport, and Bryson (1986) found that the correlation between scores on a mathematics achievement examination and the number of high school mathematics courses taken remained substantial, even after statistical adjustment for socioeconomic status (SES), verbal test score, and a mathematics pretest two years earlier. Similarly, SAT scores, both verbal and mathematics, are related to the number of academic courses taken (College Board 1989b). Self-selection is certainly involved in these correlational studies; for example, students who do well in mathematics are probably more likely to elect it than are those who do poorly. Nonetheless, it seems reasonable to believe that courses taken affect test scores, even on the more general tests such as the SAT. Stiffer course work requirements for high school graduation and for college admission, introduced in response to concern about the performance of U.S. students, can, it seems, have a positive effect. It is good news indeed that enrollment in mathematics and science increased noticeably through-

out the 1980s, and that these gains cut across ethnic groups; white, black, and Hispanic students are all enrolling in more high school mathematics and science courses than in the past (Leatherman 1989). There is still a long way to go, however. At the time of the 1986 NAEP, a quarter of eleventh graders were taking no mathematics at all; a quarter of those studying mathematics were enrolled in Algebra I or an even lower course. At the same time, only 58 percent of the eleventh graders were taking science (Applebee, Langer, and Mullis 1989).

Course work alone will not necessarily do the trick. The results will also depend on the quality of courses offered and taken in terms of content, instruction, and student effort. Some information on student effort is available in the Applebee, Langer, and Mullis (1989) review of NAEP results, and again the news is good. The number of hours students reported that they spend on homework each day was found to be positively associated with scores on the national assessments. The amount of homework reported increased from 1978 to 1986; considerably fewer students reported that homework was not assigned in 1986 than did so earlier.

In addition, course content is an important determinant of student learning. Several efforts directed at major curriculum revisions seek to enhance students' achievement levels. In 1989, the National Council of Teachers of Mathematics proposed *Curriculum Evaluation Standards for School Mathematics*, intended to enhance students' problem-solving skills. At about the same time, the American Association for the Advancement of Science released its report, *Project 2061: Science for All Americans*, articulating learning goals in science that would provide the basis for a model curriculum. The National Science Teachers Association recommended an end to the "layered" approach, in which different sciences are studied each year, in favor of an integrated approach, in which students would study each subject each year (Pipho 1989).

A 1989 report by the National Academy of Sciences called for an overhaul of the way mathematics is taught in order to emphasize problem solving over computational skills. *Everybody Counts—A Report to the Nation on the Future of Mathematics Education*, by Professor Lynn A. Steen of St. Olaf College, argues that we are not producing enough mathematically trained personnel or a high enough general level of mathematical skill. The National Academy of Sciences report encouraged an emphasis on teaching students how to think

mathematically and increasing the use of hand calculators (National Research Council 1989).

In a related effort, the College Board has attempted, through Project EQuality (EQ), to define what students need to know and be able to do in six subjects in order to be prepared for college. EQ posits that all high school students can and should meet common standards of knowledge and competence. Strengthening the quality of precollege education is one goal, and equal access to college is the other. The first step was defining "equitable standards"—what all students should know and be able to do to prepare for college. *Academic Preparation for College*, or the "green book" (College Board 1983), was developed by and with 1,400 high school and college teachers, and it presents a single set of standards for all college-bound students. EQ's Academic Preparation series (also called the rainbow books) elaborates the standards and discusses what and how to teach in each of the six basic subjects addressed in the green book: English, the arts, mathematics, science, social studies, and foreign languages.

The project has involved summer institutes, workshops, and discussions with teachers, aimed at helping teachers help students gain these competencies. College and high school administrators have used the green book to communicate college admission standards and to revise high school curricula. EQ advocacy, combined with state activism in education reform, has led to incorporation of EQ standards from the green and rainbow books into at least 24 statewide initiatives (College Board 1989a).

In summary, it appears that the preparation level of the college-going population is no longer declining; in fact, it has regained much of the ground lost earlier. Test scores have recovered to a large extent, students are enrolling in more high school mathematics and science courses, and students report being assigned more homework. It is particularly encouraging that the gaps between preparation levels of white students and those of black and Hispanic students are decreasing. Nonetheless, students are not as well prepared as most observers believe they could and should be. Especially disturbing is the level of preparation in science and in mathematics, as evidenced by high school courses taken and test performance. Even after recent gains, performance is still relatively low, both in absolute terms and by international comparison of test scores. Efforts to revise high school curricula in mathematics and science deserve the support of higher

education institutions, as do efforts to increase enrollments in high school mathematics and science courses. At the same time, the experience of the elementary and secondary sectors with high-stakes, centralized testing programs can be informative to the higher education community. Given the negative effects such testing programs can have, higher education institutions, systems, and governing boards need to focus assessment efforts on program-specific assessments that are carefully tied to the curriculum.

2

College Admission Requirements

Interaction with Secondary Schools

It is widely believed that college admission requirements affect both high school curricula and the courses selected by high school students. This belief is strongly held on college campuses. For example, when faculty members advance arguments in support of particular admission requirements, statements about "messages sent" to students and about the need to provide support to high school faculty who wish to continue offering advanced course work are regular features of the discussion. Similarly, there is recognition within the higher education community that graduate school admission requirements affect the undergraduate curriculum and student selection of courses within it. When graduate departments demand highly specialized

preparation for admission, undergraduate programs tend to become more narrowly focused, and students who are bound for graduate school tend to opt out of broader liberal arts programs. Admission requirements for a given level of education can apparently have significant effects upon the curriculum and upon student choice within that curriculum at lower levels.

The view from the high school is similar. For example, as principal of Beverly Hills High School, Levine (1984) described higher college admission standards as an essential ingredient in efforts to improve the quality of secondary school education. In this arena, the most prestigious colleges are not the most influential. Rather, state and local colleges are the institutions whose admission requirements affect the most students. Thus, for Beverly Hills High School, the University of California's admission requirements are a driving factor for many students. Changes in those requirements have led to changes in the content of some of the school's offerings and to increased enrollment in newly required mathematics courses. Although higher college admission standards alone are not sufficient to produce an improvement in secondary school curricula, they are a necessary prerequisite to such improvement (Levine 1984). There has been some concern that increased college-preparatory requirements have had a deleterious effect on the range of offerings to high school students in vocational and general curricula (e.g., Kirst 1983); however, if we believe that more students should be encouraged to choose the college-preparatory curriculum, this may be a necessary trade-off.

In a similar vein, Macroff (1983) asserted that lax college admission requirements have undercut high school programs. He cited figures indicating that in 1978, only about 15 percent of U.S. high school students were studying foreign languages. More than half of those were in first-year courses, suggesting that many do not go on even as far as the second year.

If college admission requirements affect the high school curriculum and what and how hard high school students study, they are, in turn, affected by the number of students who want to go to college and how well prepared those students are for collegiate study. There is no one ideal set of admission requirements for all schools and for all time. Increases in the size of the college-age pool, the college-going rate, and the general preparation level will cause college admission requirements to become more stringent.

Establishing Admission Requirements

Public institutions tend to state clear-cut, formula-based admission requirements; private institutions are more likely to reserve greater latitude to examine a variety of factors and to select from among applicants on bases that are not fully prespecified. Regardless of the selection device and policies in place, however, selection above a set of minimum requirements serves the purpose of allowing the institution to control its enrollment. Selection above minimum requirements is typically used not only to set and maintain standards of student preparation, but to allow the institution to achieve its optimum student enrollment. At institutions or at times in which students are less well qualified, the curriculum is undoubtedly adjusted somewhat in order to help students succeed. Nonetheless, retention and graduation rates reflect students' preparation levels. With better-prepared students, courses can start at a higher level, and a larger proportion of students are able to complete baccalaureate programs. Although faculty members prefer better-prepared students, there is a considerable range within which a majority of the faculty at most institutions would probably prefer to fill classes, rather than contract the size of the student body—and the staff.

The U.S. college cohort increased until the early 1980s, nearly doubling between 1960 and 1982. This large increase was followed by the decrease now in progress, which is of such magnitude that in 1995 the number of 18- to 24-year-olds will be back to the level of the late 1960s (Mingle 1987). Admission requirements tended to rise with the size of the college-age group. That is, not all institutions expanded their capacities in direct proportion to the expansion of the cohort. For example, at the University of Illinois at Urbana-Champaign (UIUC), requirements for fall 1962 admission to the College of Engineering were set at a level that produced a freshman class with a mean ACT composite score (ACTEC) of 22 and mean high school percentile rank (HSPR) of 76. At about this time, the campus decided to cap its enrollment of undergraduate students. For 1988, the respective means were almost 29 and 94. The reason for these increases is the larger number of very well-qualified applicants as the college-age cohort grew. The fact that these requirements can now be eased signifies a return to sanity, not a "drop in standards." We do not have

to turn down so many well-qualified students who could easily succeed academically, because there are no longer so many students applying for admission to colleges and universities. Supply and demand has a major effect on the level of selectivity. As a result, admission requirements vary among institutions and over time, and there is some college geared to admit any student graduating from high school.

Effects on Student Behavior

If admission requirements adjust to supply and demand, but also affect the supply of well-prepared students, the challenge to colleges and universities is to set requirements that will serve to spur student effort without excluding large numbers of students from higher education. It is especially important that we analyze admission practices from this point of view because of two demographic trends that are expected to have major impacts on education, including higher education, in the near future: (1) a large decline in the college-age population, currently in process; and (2) an increase in the relative size of the "minority" population, compared to the white population. If we have to adjust admission requirements to reflect lower overall demand for higher education, we should try to do so in ways that will not undercut the high school curriculum and student effort. At the same time, we will have an increasing individual and institutional stake in the preparation of minority students for college.

It can be argued that sharp declines in collegiate enrollment are unlikely, because of the increasing earnings gap between college and high school graduates that has accompanied the decline in manufacturing in the United States (Harrington and Sum 1988). The need for postsecondary education, although not necessarily a baccalaureate degree, will increase even more between now and 2000, because an even higher proportion of new jobs will require such training (Hoyt 1988). Thus, it is not clear that college enrollments will decline precipitously. It is clear, on the other hand, that segments of the population that have been underrepresented in higher education in the past will be increasingly disadvantaged in the future unless their college participation rates increase.

The rates of high school completion and college enrollment are lower for black and Hispanic than for white students. Black and Hispanic students also tend to lag behind white students in selection

of college-preparatory curricula, enrollment in advanced course work, and on college entrance examination performance. If college enrollment does not decline significantly, will maintaining current admission standards bar a growing number of minority students from higher education? This would clearly be contrary to the national interest.

Course work requirements. Breland, Wilder, and Robertson (1986) surveyed institutions concerning admission policies and practices. Their report provides some suggestions about the effects of various admission requirements on student behavior and preparation for college. For example, between 1979 and 1985, criteria for admission became more stringent, especially as reflected in high school course work required for admission. A number of institutions initiated new requirements, and others raised existing ones. The tendency toward higher requirements is especially noticeable in public four-year institutions of relatively low or moderate selectivity. These increases in requirements might have resulted in lower enrollments overall, because the college-age cohort was declining in size at the same time, or in lower enrollment of some subgroups of the college-age population. Apparently, however, students have responded by enrolling in the required college-preparatory courses. Data from both ACT and the College Board indicate that students reported more years of study in most college-preparatory subjects in 1985 than they had in 1980, and that this holds true within each of the racial/ethnic groups analyzed—native American, Asian American, black, Mexican American, Puerto Rican, and white (Breland, Wilder, and Robertson 1986). Thus, higher admission requirements for college-preparatory high school course work can serve, as intended, to help students prepare for college without disadvantaging minority group members. Although a few students may be unable to enroll in all required courses because of limitations in a high school's offerings, especially if the requirements are set at a very high level, course requirements can be met by most students. Thus, colleges should be able to maintain these requirements even if competition for students increases with further declines in the cohort.

Use of achievement tests. Beyond required high school courses, the most widely used admission screening devices are scores on the SAT or the ACT and measures of high school performance—either rank in class or grade-point average (GPA). Like required courses, GPA or

class rank requirements can presumably serve to motivate students. The effects of tests required for admission are less clear. Jencks and Crouse (1982) argue that increased use of achievement tests for admission to selective colleges could emphasize to students the importance of mastery of college-preparatory subject matter. There is evidence that performance on the more general SAT correlates with college-preparatory course work completed, as one would hope. However, this relationship is probably not as apparent to students as the relationship between performance on sharply focused achievement tests and mastery of related course work. The Resnick/Tucker proposal for syllabus-based assessment of high school students' learning would introduce a sweeping change that would go well beyond the relatively modest Jencks/Crouse proposal. Short of that, it seems that greater emphasis on demonstrated subject-matter mastery is worthy of consideration.

It has been argued that if achievement tests were used for undergraduate admission across the full range of students who go on to college, they would have to be fairly low-level tests covering just the few subjects that are offered virtually universally: a low-level mathematics and English test, with the possible addition of U.S. history and biology (Elliott and Strenta 1989). Nonetheless, if more of the selective colleges were to institute achievement-testing requirements, it might well have the positive effects suggested by Jencks and Crouse. The argument is somewhat like that involved in the failure to test writing directly in the process of admission—and sometimes of placement and the award of proficiency credit as well. Independent of the reliability and predictive validity of writing samples, their use indicates to students that learning to write well is an important goal. Failure to test writing directly seems likely to be interpreted in the opposite way. In fact, during the years when UIUC provided proficiency credit for freshman composition based solely on the ACT English subtest or the SAT verbal section, we received complaints from high school personnel that this policy directly undercut Advanced Placement English classes. Students with test scores sufficiently high to have UIUC credit "in the bag" did not see the point of enrolling in advanced English courses. The use for admission of achievement tests that are tied to the curriculum and to what we want students to learn is an area worthy of greater attention. It has the promise of supporting rigor in the high school curriculum and encouraging student efforts without creating additional barriers to admission.

In short, it appears that high school course requirements can help motivate students to become better prepared for college than they might otherwise be. It also seems that greater use of achievement testing for admission to selective campuses could help motivate students to learn and retain important components of the curriculum. Even if, in general, the competitive level recedes as the college-age cohort decreases, colleges can continue to emphasize the importance of mastery of the college-preparatory curriculum in their admission and articulation systems by requiring certain course work and asking to review evidence of its mastery.

Improving Minority Access to Higher Education

Black and Hispanic students continue to lag behind white students in the rates at which they complete both high school and college, and the gap increases at each successive educational level (Thomas 1986). The high school graduation rate of black students has increased dramatically, from 10 percent in 1940 (Wharton 1988) to 76 percent in 1989, close to the 82 percent rate of white students in the same year (American Council on Education (ACE) 1991). The high school completion rate of Hispanic students has also improved, but not as dramatically as that of black students. In 1986, the graduation rate of Hispanic students was approximately 56 percent (ACE 1991), up from 52 percent in 1972 (Mingle 1987). Within both minority groups, women complete high school at higher rates than men (ACE 1991).

College-going rates for minority students increased through the mid-70s then decreased. By contrast, among white students, 30 to 39 percent of high school graduates age 18 to 24 have been enrolled in postsecondary educational institutions since 1972. Both black and Hispanic attendance peaked in 1976, at 33 percent and 36 percent respectively, but by 1985 it had declined to 26 and 27 percent, levels close to those of 1972. Even with gains since 1985, neither minority group has again achieved the 1976 high (ACE 1991). The number of black and especially Hispanic students attending college is of course further reduced by high school graduation rates that do not yet equal those of white students.

Among those who go to college, students of different ethnic backgrounds display different tendencies to select two-year rather

than four-year colleges. In fall 1988, almost two-thirds of white students (64 percent) were enrolled at four-year institutions. Black and Asian American students displayed very similar enrollment patterns, with close to 60 percent of each group enrolling in four-year institutions. However, Hispanic and native American students clustered instead at two-year colleges, with less than half of each group attending four-year institutions (ACE 1991).

Once in college, completion varies among ethnic groups, and there is a relationship with the type of institution attended. In the 1980 HSB sample of high school graduates who went straight on to college, 51 percent of those who first attended public four-year colleges were still enrolled full time four years later with no attendance break; only 9 percent of those who started at two-year institutions were full-time seniors four years later (Mingle 1987). Continuous full-time enrollment over four years is a very stringent criterion, but the difference between 51 percent and 9 percent is also very large. Transfer rates from two-year colleges have never reached the levels we had envisioned for them. The fact that Hispanic and native American students tend to enroll so heavily in two-year colleges puts them at significant risk for nonattainment of the baccalaureate degree.

Special Admission Policies

Clearly, colleges need to continue and even increase special efforts to guide minority students into college-preparatory programs and to recruit these students into college. In addition, it is critical that special admission review of the credentials of minority students continue as long as there are systematic differences in the college preparation of major subgroups of the population. Unfortunately, the Breland, Wilder, and Robertson survey (1986) indicates that although many institutions make exceptions for minority students, the number doing so dropped between 1979 and 1985. It is critical that these efforts continue in response to both demographic shifts and the increasing need for postsecondary education as an entry credential to the labor force. Once students are admitted, programs that will assist them in completing their degrees by providing social, financial, and academic support will continue to be needed. Finally, four-year colleges should expend special effort in encouraging Hispanic and native American students in particular to consider the benefits of four-year rather than

two-year institutions, and to work with two-year college students and institutions to ease and encourage transfer.

The foregoing comments assume a system in which institutions, including public ones, differ in their levels of selectivity, so that a student may meet the requirements of one institution, but not another. The existence of a gap in average preparation levels between white students and disadvantaged minority group members can mean that without special admission programs, relatively few minority students will meet the requirements of highly selective institutions. Indeed, Astin (1985) expressed serious reservations about the propriety of selective admission at public research institutions. An alternative admission model sometimes advanced to provide more equitable access to highly selective institutions is random selection of students above some floor. See, for example, McPherson and Schapiro (1990).

Random selection. UIUC reacted to such concerns when it decided to admit or reject students at random from among those who met minimum standards for admission to the College of Liberal Arts and Sciences for fall 1970. The experiment and public reaction to it were described in detail in Loeb (1982). In the context of this monograph, several points are worth examining. First, public reaction was so negative that the experiment was halted almost as soon as it began. On December 12, an institution that is not generally known for the speed of its reaction time rescinded the random rejections that had been issued on December 1. Two aspects of random admission and rejection drew particularly heated criticism: random decision signaled loss of control over the environment, and it failed to reward merit. People felt absolutely helpless in the face of rejection by a random-number generator, and they were outraged that hard work and superior achievement no longer paid off.

In addition, had we continued the process, we would have admitted a somewhat less well-prepared group of students, who would have dropped out or failed at a somewhat higher rate and graduated at a somewhat lower rate. To allow for their lower level of preparation, the level of introductory course work would have had to be adjusted over time, with the effect that the state would no longer have had a publicly supported campus geared to serve the very well-prepared student. Opportunity for academically well-prepared stu-

dents from low- and middle-income families would have been reduced as a result. One couple wrote the Board of Trustees at the time stating, "the charge that the University of Illinois with its present admission policy may be catering to an economic elite strikes us as phony. The affluent are not likely as a large group to select Illinois for their children. On the other hand, those parents with limited means but bright children clearly have no other choice but Illinois" (Loeb 1982, p. 548). Random selection may sound appealing in theory, because it equalizes the opportunity for admission. However, the need to reward effort and to provide the bright low- or middle-income student with the opportunity to study at a research university argue for selection of those best qualified for admission. Selection serves to encourage students to excel in high school. Furthermore, those who have excelled feel they deserve admission; it is virtually impossible to explain rejection to the very well-qualified student who has been randomly denied admission. Finally, differing admission requirements reflect, but also produce, different kinds of student bodies and institutions, and in a very real sense the existence of these different kinds of institutions broadens opportunity.

Conclusions

This review of college admission requirements suggests several conclusions. First, there is no one set of "correct" admission standards for all colleges and for all time. Requirements will vary from institution to institution and from time to time, as institutions and students respond to market forces. At the same time, college admission requirements affect the high school curriculum and students' course selection and effort within it. Thus, it is important that colleges structure admission requirements and their review of credentials in ways that will encourage students' effort in rigorous college-preparatory programs, even when requirements soften as, for example, when there is a smaller cohort of high school graduates. High school course requirements are a means of encouraging appropriate preparation for college without erecting an unscalable barrier to college admission. A shift from examination of performance on general academic tests such as SAT and ACT, which are not tied to any particular curriculum, toward evaluation of performance on more heavily achievement-oriented examinations would also be worth trying, especially at those

selective schools that do not currently require achievement tests. Again, student effort could be encouraged without screening out any more potential students than are rejected as a result of the admission requirements currently in place.

A final concern has to do with access by minority students, especially black and Hispanic students, whose rates of high school and college completion have historically been below those of white students. Special recruitment and admission programs will become even more critical as these students begin to represent a larger proportion of the college-age cohort, and as postsecondary education becomes even more important to success in the labor market. Random selection is sometimes suggested as one means of increasing the access of disadvantaged groups to higher education. When it was tried, however, a major objection was that it failed to reward effort. Thus, random admission does not appear to meet the challenge that admission requirements should be such that they encourage students' effort in rigorous programs. In addition, random selection could serve to homogenize institutions, thereby decreasing opportunity.

3

The Higher Education Curriculum

Ultimately, what students learn in college is very heavily dependent on what we ask them to learn and on the teaching methods we employ in helping them learn. Material to which we do not expose students is not likely to be learned. Similarly, we do not contribute to the improvement of students' writing unless we assign written work and evaluate it in ways that will guide their efforts to improve. During the 1980s, the state of collegiate curriculum and teaching was a major focus of a stream of reports on conditions in higher education. These include *To Strengthen Quality in Higher Education* (National Commission on Higher Education Issues 1982); *Involvement in Learning* (National Institute of Education 1984); *To Reclaim a Legacy* (Bennett 1984); *Integrity in the College Curriculum* (Association of American Colleges 1985); *Liberal Learning and the Arts and Sciences Major* (Association of American Colleges 1991); *College: the Undergraduate Experience in America* (Boyer 1987); *Strengthening the Ties that*

Bind (Professional Preparation Network 1988); and *Structure and Coherence* (Zemsky 1989).

Conditions in Higher Education

Some of these reports are heavily critical of the higher education curriculum in terms of content, coherence, skills taught, and teaching methods employed. Common complaints involve inadequate attention to the development of communication skills; weak preparation in mathematics, science, and foreign languages; the lack of a core program or shared values and knowledge, and failure to develop coherent programs that help students connect their majors with other learning and experiences; excessive specialization and vocationalism, with a fragmented and overdepartmentalized approach to learning; and inadequate attention to fostering the development of students' values and a sense of citizenship and community. Instructional methods are criticized as encouraging student passivity in the classroom, with too little active student involvement in the teaching-learning process. An ascendancy of research over teaching on the agenda of college faculty draws criticism, as does the need for greater involvement of faculties in the training of graduate students to become excellent teachers as well as researchers. Finally, several of these critiques call for the measurement of outcomes of higher education, including students' cognitive growth, to ensure appropriate standards of student achievement and competence at the point of the baccalaureate degree. These issues are all central to questions of standards within higher education.

Gaff (1988) reviewed recent curricular debates and reforms at individual campuses that address the issues raised above. The clear focus of curricular revision is general education, and large numbers of colleges and universities have made real efforts to stengthen their undergraduate general education curricula. Two key issues are content and coherence.

Content

The content question, or what students need to know, often centers on a debate about the extent to which classic Western texts, or "great books," should dominate the curriculum. Critics of that approach

point out that it is impossible to agree on a single set of the most important works, and that a curriculum based on such texts generally ignores contemporary works, modern science and technology, and works by and about women, minorities, and non–Western cultures.

The debate about curricular content includes questions about the balance between and integration of general education and specialization, as well as concerns about the sometimes seemingly competing needs for cultural literacy, cultural pluralism, and internationalization. In addition, the issue of content involves determination of what skills students need to develop throughout their courses of study.

The study of both gender and ethnicity is receiving greater attention on many campuses, with the intention of preparing students to function effectively within a pluralistic society. The incorporation of new scholarship on these topics into the curriculum is becoming somewhat more common and more acceptable, although it is still controversial. Internationalization of the curriculum, with emphasis on the study of other cultures—including non-Western cultures—is a related trend that reflects increased world economic interdependence.

Coherence

Coherence is the second major emphasis of on-campus reforms (Gaff 1988). Core curricula tend to be offered primarily at small, relatively homogeneous liberal arts schools. At most institutions, comprehensive rethinking of the curriculum usually leads to more requirements for graduation and a more limited set of choices in satisfying breadth requirements.

Fundamental skills are also receiving more attention. These may include writing, speaking, critical thinking, mathematics, and foreign languages. There is a marked tendency toward greater emphasis on the liberal arts, even within preprofessional or professional programs. Interdisciplinary or thematic courses and advanced, integrative capstone courses are becoming more widely available in response to the need to help students integrate their academic learning across different disciplines and with the world at large. Similarly, efforts are being made to continue general education throughout the four years of study to help students integrate what they have learned.

Instructional Methods

Instructional methods are currently receiving considerable attention on campus, and there is a great deal of interest in more active approaches to learning and teaching in order to help students acquire not only factual knowledge, but also methods of thinking and problem solving. This is especially important because lecturing to groups of relatively passive students is probably the most common approach to teaching in higher education (e.g., McCord 1985). Large research institutions are particularly likely to rely on lectures to large groups in introductory courses, although this format is often supplemented by discussion sections with teaching assistants that provide opportunities for active student involvement through discussion, writing, problem solving, etc.

Increased attention to the study of learning and teaching and to the factors associated with successful learning and teaching has assumed a higher priority within many different disciplines, as part of the renewed focus on undergraduate education in general, and that attention has begun to bear fruit. One dramatic example is the instructional method designed by Professor Philip Uri Treisman, formerly at the University of California at Berkeley, which helps students master calculus who are otherwise at high risk of failure. The Treisman program for calculus study has evidenced such unusual success that it is worth describing in some detail (Treisman 1985).

Treisman program. The program involves an intensive, small-group workshop experience designed to challenge students and help them learn to learn together. Emphasis is placed on helping students interact with both the subject matter and each other. Collaborative study is encouraged through the workshops. Participants include large numbers of black and Hispanic students, whose success rates in calculus have, on average, been quite low. The goal is for students to achieve A-level mastery of the material.

At each workshop session, students work on new, challenging problems. They are expected to work together and to help each other. Professor Treisman explains that

> the basic premise underlying workshop instruction is that through the regular practice of testing their ideas on others, students will develop the skills of self-criticism essential not only for the development of mathematical sophistication, but for all intellectual growth. Moreover, by continually explaining their ideas to others,

> students acquire the same benefits of increased understanding that teachers themselves regularly experience. (Treisman 1985, p. 46)

Grades in the first-term calculus course have been an average of a full point higher for black students who participated in the workshop than for those who did not. In general, black workshop participants have averaged at or above the class average, but black nonparticipants have averaged well below the class average. The percentage of black workshop students receiving D or failing has been much lower than the percentage for nonparticipant black students. Similarly, the proportion receiving B or better has been substantially higher. At each level of SAT mathematics test score, grades of black workshop participants have been higher than those of black nonparticipants and of a white and Asian American comparison group.

Graduation rates of black workshop participants who entered in 1978 and 1979 equaled the overall graduation rate for the Berkeley campus (65 percent). The graduation rate of nonparticipating blacks was 41 percent, not much higher than the 39 percent graduation rate of all blacks who entered from 1973 to 1977, the five years before the workshops were initiated. Predictably, the proportion of black workshop participants who not only graduated but who also majored in mathematically-oriented fields of study was significantly higher (44 percent) than the proportion of nonparticipants (10 percent). Before the workshop, the rate at which black freshmen ultimately graduated in mathematics-based majors was 11 percent (Treisman 1985).

Workshop participation is clearly associated with success in calculus, persistence at and graduation from the university, and graduation in mathematics-based majors. Selection factors seem insufficient to explain the results, since the mathematics performance and persistence of nonparticipating black students are very similar to those of all black students prior to the workshops. The program apparently provides an effective approach to teaching calculus to a population that in the past has had considerable difficulty with the material.

The workshop approach has been implemented at a number of colleges and universities nationwide (Watkins 1989), and Treisman's results have been successfully reproduced. For example, the results at UIUC have been extremely gratifying (McCreary and Peressini 1990). Black and Hispanic students and students who graduated from small rural high schools were recruited into the program in fall 1989; students from these segments of the population have failed calculus at much higher than average rates in the past. Minority workshop

participants began essentially even with minority nonparticipants in terms of ACT:M, at 26.3 and 26.4, respectively. The workshop students were all enrolled in the same lecture section of the calculus course, for which there were eight discussion sections. Examinations for the entire lecture group were graded together to ensure that uniform standards were applied. The workshop group ranked seventh of the eight discussion sections in terms of their average on the first hour examination, but their relative position improved over the course of the semester. On the final examination, they had the highest average score of the eight discussion sections. Table 1 provides grade distributions for the students in the course.

In round numbers, more than half (57.1 percent) of the minority workshop participants earned A's and B's, compared to half of all students in the lecture and to one-third of the minority students not in the workshop. Of all minority students in all lecture sections of this first calculus course, about one-quarter (24 percent) earned A's or B's. Equally important is the low failure rate of workshop participants. Twenty percent of all workshop members and 24 percent of minority workshop participants received D's or E's. This is very close to the 21 percent rate of D's and E's for all students in the lecture section, and compares very favorably to the 48 percent rate of minority nonparticipants in that lecture section and to the 45 percent rate of all minority students in the course (McCreary and Peressini 1990).

The Treisman approach works. It appears to provide an effective method for helping students learn calculus that is especially applicable to groups of students who have historically had difficulty with the material, even when they seem well prepared to undertake its study. Because calculus is a "gateway" course, which determines a student's eligibility to major in mathematics-based fields such as engineering, sciences, mathematics, and some social and behavioral sciences, among which are many of the fields expected to be highest in demand in the near future, Treisman's approach is all the more important. It seems to provide a means by which well-prepared students who are willing to invest extra time and effort can learn not just calculus, but also an approach to study that should be helpful in later courses, as well. It is to be hoped that continued interest in improved methods of instruction within the various disciplines will lead to similarly effective methods in other areas.

A final point is worth noting with regard to the importance of

TABLE 1. Fall 1989 Calculus Grades for UIUC Workshop Participants and Nonparticipants

Grades	*All workshop participants (25 students)*	*Minority workshop participants (21 students)*	*Minority students not in workshop (19 students)*	*All students in lecture (219 students)*	*All minority students in mathematics 120 (159 students)*
A	16.0%	9.5%	14.3%	18.5%	5.2%
B	44.0	47.6	19.0	31.9	18.5
C	20.0	19.0	19.0	28.2	31.9
D	12.0	14.3	9.5	7.9	19.3
E	8.0	9.5	38.1	13.4	25.2
Average course grade	3.5	3.3	2.6	3.3	2.6

Source: McCreary and Peressini (1990).

research such as Treisman's: such studies require the faculty in each department to work with the full range of students. A review of academic support programs found that integration into the normal academic life of the institution was a key element of those that were successful in terms of impact on student retention and GPA. The least successful programs depended on isolated remedial course work conducted apart from regular classes; the most successful programs tended to be regular components of departmental teaching programs (Keimig 1983). Thus, efforts to study and improve teaching within the disciplines are much more likely to yield results than are the separate remedial programs offered by other units at a distance from department faculty and programs.

Current State of Reform

Responses to the calls for reform of undergraduate education have been quite positive. Curricular revisions are leading to greater emphasis on general education, the development of fundamental skills such as writing, and broadening the curriculum to provide greater understanding of other cultures and subgroups of the population that had previously tended to be overlooked. A healthy increase in interest in the effectiveness of different methods of instruction has had some dramatic effects. Should we assume that the large number of critical reports published during the 1980s, and the positive responses to those criticisms, indicates a recent deterioration of curriculum and teaching in higher education? An illuminating article by Arthur Levine suggests a quite different interpretation.

Levine (1986) reviewed three reports on higher education from the 1800s: by the Amherst College faculty (1827), by President Francis Wayland of Brown (1842), and by the Yale faculty (1828). He discovered striking similarities between the problems perceived then and now.

> The curriculum is too vocational: "Our colleges . . . are at present scarcely more than schools for the education of young men for the professions." (Wayland, p. 153)
>
> The curriculum is bloated and confused: "we have so crowded it with studies as to render it superficial and probably less valuable." (Wayland, p. 153)

> The quality of students is declining: "The candidates for entrance are found more and more imperfectly prepared and thus the standard of college education is more and more depressed." (Wayland, p. 153)
>
> The quality of teaching is poor: "Not one of our colleges is a place of thorough teaching; and not one of the better class of them does half of what it might do, by bringing the minds of its instructors to act directly and vigorously on the minds of its pupils." (Yale, p. 43)
>
> School-college cooperation needs to be enhanced: "Schools and colleges are not rival institutions. The success of each is essential to the prosperity of the other." (Yale, p. 29)
>
> Public confidence in higher education is low: "One fact is becoming more and more obvious every day. The American public is not satisfied with the present course of education in our higher seminars." (Amherst, p. 5)

The reports of the 1980s do not suggest a recent decline in quality, but rather a reexamination of some issues that are periodically debated as the pendulum swings on questions such as professional preparation versus liberal arts education. In fact, higher education is arguably one of the most effective of the major institutions in the United States today, and there is concern that these calls for change, some fairly strident, may undermine the trust on which the autonomy of higher education is based (e.g., Trow 1986). There have been many recent calls for state imposition of quality control on higher education, and these should be greeted with caution. Colleges and universities have generally been autonomous, and imposition of external quality-control systems would be likely to undermine, rather than improve, a system that continues to be tremendously successful. In addition, both Trow (1986) and Boyer (1987) eloquently argued the need to maintain a diversity of programs and institutions in higher education. The college-going population is quite heterogeneous. Virtually any student wishing to enroll in college can do so somewhere, and virtually any program of study is available within the system. Institutional responses to the issues and challenges raised in the various higher education reports should and will differ. The unit of reform needs to be the individual institution, not the whole system or even large subsets such as state systems. And, indeed, individual faculties have been undertaking important revisions of both the undergraduate curriculum and instructional methods.

This review of responses to criticisms found in reports on higher education indicates that curricular reform is currently underway at colleges and universities throughout the nation. A heightened interest in general education and in other questions of undergraduate education is noticeable virtually everywhere. Within the disciplines, a renewed concern for teaching methods is much in evidence. Many colleges have moved toward more closely specified, stiffer graduation requirements and toward curricula that are more coherent within themselves. The question of inclusion of works by "new" authors and scholars is more controversial; some believe that broadening the content of the curriculum works against high curricular standards. There is no doubt, however, that the design of a list of great books is in itself fairly arbitrary; literary works chosen for anthologies have been shown to vary over the course of time (e.g., Lauter 1983). Broadening the materials that students may encounter and studying some works by women and people of color seems likely to help students achieve a wider understanding of varying points of view and value systems. In an increasingly diverse world, achieving that wider understanding seems worth the sacrifice of the potential for a standardized set of common items of knowledge and of literary background. In any event, the outcome of these controversies should and will vary from campus to campus. Regardless of the specific outcomes, it is important to note that there is considerable renewed interest in the undergraduate teaching-learning process throughout higher education today.

4

Grading Standards in Higher Education

Grading practices are a key component of academic standards. Yet the question of how to identify appropriate grading standards is a complex one without an easy answer. To some, appropriate grading standards require that a fixed proportion of students receive each letter grade, regardless of the entering qualifications of the students involved or the average quality of their performance. For example, the major faculty committee concerned with educational policy at UIUC recently discussed a proposal to authorize plus and minus grades. A debate ensued between two esteemed faculty members, both in their last of many years of teaching in disciplines that are currently sought after by large numbers of students and that, as a result, enroll students with exemplary qualifications. One espoused the seemingly absolutist position that if his fellow faculty members would only go back to doing their jobs, there would be no need for plus and minus grades, for all five traditional grades, A through E, would be pressed into service as they had been in his early days of teaching. The other

countered that his students are now academically much stronger than they used to be. Indeed, the average student is now fully capable of qualifying to enter graduate school, so a B average for his classes is legitimate. Plus and minus grades would thus permit helpful distinctions to be made within what has become a narrow band.

At the time that both faculty members began their careers, UIUC was essentially an open admission institution, although it had serious college-preparatory high school course work requirements. Should the grade distribution be the same now, when admission is quite selective, as it was under virtual open admission? This appears to be an extreme position. As selectivity has increased, it seems probable that course content has become more demanding. Even if that is not the case (or, perhaps, especially if that were not the case), awarding a fixed proportion of each letter grade to a more able group of students would assign not an absolute, but a purely relative, meaning to grades. An A would mean only that within the group, a student was in the top *X* percent. The achievement levels required for each grade would undoubtedly be higher than in the past. Students would thus be penalized in terms of grades for selecting an institution where they would join a more competitive group, within which they could learn more because the group could be offered more challenging material.

Achieving Appropriate Grading Standards

If maintenance of appropriate grading standards does not necessarily imply a fixed proportion of each letter grade, what does it mean? Let us adopt the following definition of equality in grading standards, recognizing at the outset that it is impossible to monitor: grading standards are equal if equally prepared and motivated students, presented with the same materials to learn via the same instructional and testing methods, emerge with the same distribution of grades.

The average grade level is often taken as an index of academic standards, as for example when the "grade inflation" of the '60s and '70s is regarded as signaling a decline in standards. However, directly equating average grade levels with standards is obviously questionable, even when entering qualifications and motivation of students are equal. The programs may involve different material, one body of which is somehow more difficult to master. On the other hand, dif-

ferent programs might involve the same curricular material but one might cover more material, go into greater depth, or demand more study time of students than the other. Differences in thoroughness of coverage seem likely to occur, for example, when student entry qualifications differ considerably. Programs at more selective institutions are presumably able to cover material in greater depth and students are expected to emerge with a fuller understanding than they would from a similar program at a less selective institution. Would equal grading standards demand that 90 percent of the material covered be mastered for an A even when coverage differs? Or do equal standards require that only a fixed proportion of the students could receive A's? Neither approach seems to define equal standards. Finally, programs might differ in the method of instruction, so that students might learn more in one than the other on that basis. A program that produces more total learning should be expected to produce a higher GPA, if student learning is reflected in grades. Yet a simple comparison of GPAs in the absence of a direct measure of the amount of learning, or the final level of knowledge and skills, is often assumed to be an index of the standards in place.

Added to these complexities is the fact that different individual faculty members tend to have different expectations and procedures for grading. The GPA alone is a very rough index of both individual student achievement and academic standards of the institution. Nonetheless, examination of GPA provides some interesting clues to faculty expectations and to grading standards, especially if program content can be controlled to some extent by looking at grades in different majors, and if enough is known about student qualifications to allow for statistical control of that variable, as well.

Statistical Studies of Grading Practices

Klitgaard's (1985) study of selection and prediction in the upper tail of the normal curve, *Choosing Elites*, provided data that allow an exploration of grading practices at colleges of greater and lesser selectivity. He presented data on SAT and ACT, high school grade-point average (HSGPA), and college GPA for colleges grouped according to the average test scores of entrants to each college. These data quite strikingly documented the very large differences in the preparation levels of entering students at U.S. institutions of higher education. At

93

the most selective institutions, SAT averages were 1200 and above and HSGPA averaged 3.72. At the least selective, SAT averages were less than 600 and HSGPA averaged 2.46.

College GPAs were directly related to the SAT averages and HSGPAs of these schools. Students at the most selective schools averaged almost a grade-point average higher than students at the least selective schools (3.02 versus 2.11). Does this mean that the most selective schools are easier, perhaps helping to explain their popularity with students? Of course not. College GPA can be predicted from both HSGPA and test score (ACT or SAT) for students in general, and for students at a particular school or set of schools. At the most selective colleges in Klitgaard's study, there is not a great deal of variation in the academic qualifications of students because of the selection process; prediction is lessened by low variability. Even here, however, there is a moderate correlation ($R = .41$) between college grades, on the one hand, and HSGPA and admission test scores on the other. Moderately selective schools, with greater ranges of student qualifications, have multiple correlations in the middle 50s. Thus we should expect that students at colleges with higher averages on HSGPA and ACT or SAT will earn higher GPAs than students at colleges with lower HSGPA and test score averages.

Comparison Among Institutions

Klitgaard provides the regression equation relating college GPA to SAT and HSGPA for each group of schools, allowing a comparison of the predicted college GPA of a student whose preparation level is about average for that institution with the GPA the same student might be expected to earn at more or less selective institutions.

Table 2 shows predicted GPA at institutions of each selectivity level (indicated by SAT average for the college) for students whose SAT and HSGPA are at approximately the average for one of the institutional selectivity levels. The first two columns show the student SAT and HSGPA on which the predicted GPA is based. The remaining columns list the predicted GPA at institutions of specified selectivity levels. Thus, each row provides the predicted GPA for a student with a stated SAT and HSGPA at institutions of varying selectivity levels. The boldface entries represent the predicted GPA for a student at about the mean SAT and HSGPA for institutions at each selectivity level.

The columns in Table 2 indicate that within each band of insti-

TABLE 2. Predicted GPA at Institutions of Varying Selectivity Levels

Student		*College SAT average*								
SAT	*HSGPA*	*1200+*	*1100–1200*	*1000–1100*	*900–1000*	*800–900*	*700–800*	*600–700*	*<600*	*All institutions*
1200	3.7	**2.911**	2.985	3.109	3.224	3.292	3.407	3.686	4.403	3.285
1150	3.5	2.775	**2.830**	2.960	3.065	3.120	3.240	3.510	4.175	3.121
1050	3.3	2.569	2.610	**2.756**	2.851	2.888	3.008	3.234	3.817	2.894
950	3.1	2.363	2.390	2.552	**2.637**	2.656	2.776	2.958	3.459	2.668
850	2.9	2.157	2.170	2.348	2.423	**2.424**	2.544	2.682	3.101	2.442
750	2.8	1.984	1.995	2.191	2.261	2.248	**2.363**	2.444	2.792	2.267
650	2.6	1.778	1.775	1.987	2.047	2.016	2.151	**2.168**	2.434	2.041
600	2.5	1.675	1.665	1.885	1.940	1.900	2.015	2.030	**2.255**	1.928

Note: Boldface entries represent predicted GPA for a student at about the mean SAT and HSGPA for institutions at each selectivity level.
Source: Klitgaard (1985).

TABLE 3. Predicted Freshman GPA Over Time at UIUC College of Liberal Arts and Sciences

	ACT C			
HSPR	20	23	26	29
99				
1985	3.789	3.909	4.029	4.149
1980	3.857	3.992	4.127	4.262
1975	3.859	4.009	4.159	4.309
1970	4.058	4.103	4.148	4.193
1965	3.312	3.531	3.750	3.969
90				
1985	3.600	3.720	3.840	3.960
1980	3.650	3.785	3.920	4.055
1975	3.670	3.820	3.970	4.120
1970	3.860	3.905	3.950	3.995
1965	3.060	3.279	3.498	3.717
80				
1985	3.390	3.510	3.630	3.750
1980	3.420	3.555	3.690	3.825
1975	3.460	3.610	3.760	3.910
1970	3.640	3.685	3.730	3.775
1965	2.780	2.999	3.218	3.437
70				
1985	3.180	3.300	3.420	3.540
1980	3.190	3.325	3.460	3.595
1975	3.250	3.400	3.550	3.700
1970	3.420	3.465	3.510	3.555
1965	2.500	2.719	2.938	3.157

GPA Prediction Equations:

1985 $\widehat{GPA} = .040(ACT\,C) + .021(HSPR) + .91$

1980 $\widehat{GPA} = .045(ACT\,C) + .023(HSPR) + .68$

1975 $\widehat{GPA} = .050(ACT\,C) + .021(HSPR) + .78$

1970 $\widehat{GPA} = .015(ACT\,C) + .022(HSPR) + 1.58$

1965 $\widehat{GPA} = .073(ACT\,C) + .028(HSPR) - .92$

Note: A = 5.0.

tutional selectivity, and at all institutions, students with higher entering qualifications earn higher grades on the average. The rows indicate that, almost without exception, a student with a given set of entry qualifications is expected to earn lower grades at more selective institutions than at less selective ones. Apparently, more selective institutions give higher grades than less selective ones, but when student credentials are held constant, the average GPA is lower at more selective institutions. Thus it appears that more selective schools are somewhat more demanding than less selective ones in their award of grades. For all the complaints one hears and makes about students who are excessively grade motivated ("Will it be on the exam?"), students generally seem to strive for admission to relatively demanding institutions, even though the odds are that their GPAs would be higher at institutions for which they are unusually well prepared.

Comparison Within an Institution

If more selective schools seem to be "tougher" in the award of albeit relatively high grades, how about programs within institutions? Table 3 shows predicted freshman GPA over time for the College of Liberal Arts and Sciences at UIUC; Table 4 gives comparable data for the College of Engineering. Predicted GPA is displayed as a function of high school percentile rank (HSPR) and ACT Composite (ACT:C) score in five-year intervals, from 1965 through 1985. (Note that at UIUC, A = 5.00.) The College of Liberal Arts and Sciences, which enrolls approximately 40 percent of all undergraduates, more or less mirrors a heterogeneous campus in terms of academic programs; these include the full range of humanities, social and behavioral sciences, natural sciences, and several professionally oriented programs, such as chemical engineering and secondary education. Table 3 indicates that the GPA of freshmen with a given level of preparation in terms of HSPR and test scores climbed until 1970 or 1975 and declined somewhat thereafter. Even after the decline, 1985 predicted GPA is higher than that of 1965 for each combination of HSPR and ACT:C. This suggests that high grades became easier to earn, and that expectations or standards decreased somewhat overall, even as selectivity of the institution increased. Although adjustments in course content in response to increasing selectivity may be partially responsible, Klitgaard's data indicate a lower predicted GPA for a given student at

TABLE 4. Predicted Freshman GPA Over Time at UIUC College of Engineering

	ACT C			
HSPR	20	23	26	29
99				
1985	3.224	3.479	3.734	3.989
1980	3.590	3.782	3.974	4.166
1975	3.572	3.758	3.944	4.130
1970	3.574	3.721	3.868	4.015
1965	3.138	3.396	3.654	3.912
90				
1985	2.900	3.155	3.410	3.665
1980	3.230	3.422	3.614	3.806
1975	3.320	3.506	3.692	3.878
1970	3.340	3.487	3.634	3.781
1965	2.940	3.198	3.456	3.714
80				
1985	2.540	2.795	3.050	3.305
1980	2.830	3.022	3.214	3.406
1975	3.040	3.226	3.412	3.598
1970	3.080	3.227	3.374	3.521
1965	2.720	2.978	3.236	3.494
70				
1985	2.180	2.435	2.690	2.945
1980	2.430	2.622	2.814	3.006
1975	2.760	2.946	3.132	3.318
1970	2.820	2.967	3.114	3.261
1965	2.500	2.758	3.016	3.274

GPA Prediction Equations:

1985 $\widehat{GPA} = .085(ACT\,C) + .036(HSPR) - 2.04$

1980 $\widehat{GPA} = .064(ACT\,C) + .040(HSPR) - 1.65$

1975 $\widehat{GPA} = .062(ACT\,C) + .028(HSPR) - .44$

1970 $\widehat{GPA} = .049(ACT\,C) + .026(HSPR) + .02$

1965 $\widehat{GPA} = .086(ACT\,C) + .022(HSPR) - .76$

Note: A = 5.0

more selective institutions. Thus, a higher predicted GPA in the College of Liberal Arts and Sciences, despite the fact that the college is more selective, does seem to suggest a lowering of grading standards, or grade inflation.

Students enrolled in the College of Engineering take most of the science and mathematics courses that dominate their freshman curriculum in the College of Liberal Arts and Sciences. Nevertheless, Table 4 indicates that engineering students had smaller increases in GPA from 1965 to 1970 or 1975, and that the subsequent decline brought their 1985 expected GPA to a level generally lower than that of 1965. These data suggest that academic departments varied among themselves in grading practices between 1965 and 1985. Indeed, at every level of test score and HSPR in the table, predicted GPA for 1985 for engineering students, reflecting grades given primarily by the science and mathematics departments of the College of Liberal Arts and Sciences, were lower than those of students enrolled in the broad range of majors within Liberal Arts and Sciences.

Research by Strenta and Elliott (1987) at Dartmouth confirmed that major fields that attract students who are better prepared in terms of SAT scores tend to employ stricter grading standards than programs that enroll less well-prepared students. Replicating a study by Goldman and Widawski (1976) at the University of California-Riverside, Strenta and Elliott found that different departments systematically tend to give different grades to the same students, and that departments enrolling students with relatively high scores on the SAT give relatively low grades. At both institutions, the physical science and mathematics departments tended to attract the better-prepared students and to grade relatively stringently. These data are compatible with the UIUC data presented previously. It appears that the competitive level of programs, whether within or across institutions, tends to vary as a function of student preparedness. What is not clear, however, is whether it is advantageous for a well-prepared student to enroll in a more competitive program in terms of stimulation, demands, and depth and breadth of knowledge acquired, but this appears to be a reasonable hypothesis.

5

College Outcomes

The final point at which students are judged is graduation, and the performance level of graduating seniors or of recent college graduates is yet another indication of the standards in effect at institutions of higher education. The completion of curricular requirements is the one criterion that virtually all institutions apply to students at the point of graduation, although requiring senior theses, senior projects, capstone courses, and/or other means of integrating and examining students' achievements is widespread. A number of observers believe that measuring what a student has learned against previously defined learning expectations is the primary means of ensuring high quality in higher education (e.g., Halpern 1987; Astin 1987). Thus, for example, there have been numerous calls for measures of student competency or achievement to determine whether students should progress to higher levels of education (for example, in Florida sophomores must pass an examination to enter the junior class (Cereszko 1987)) and to judge institutional effects, or value added (for example, in Tennessee funding for postsecondary institutions is contingent on indices of improved student outcomes (Banta and Moffett

1987)). Such assessment is not as simple as it might appear to be, however, as the following brief overview of some of the relevant literature indicates.

Difficulties in Measurement of College Outcomes

Research on college outcomes in terms of factors such as knowledge acquired and attitude change has been of interest to scholars and practitioners alike, but it is complicated by several design considerations. One typical approach—studying a group before and after college—does not allow the unqualified conclusion that college attendance itself is responsible for any change observed, for several reasons. We typically lack a noncollege control group against which to compare change that occurs during the college years. Even when a noncollege comparison group is available, allowing us to estimate the effects of simple maturation, we do not know how much of any difference observed is due to factors associated with self-selection into the two groups: Were those who attended college more highly motivated to learn from any experience than those who did not? Might the college group have learned more and developed skills to a higher level than the noncollege group, even without college? Design factors that cloud the interpretation of data on college outcomes are more fully addressed in Pace (1979) and Pascarella (1985). Having acknowledged the complications, however, it is nonetheless possible to draw some inferences about the effects of college from available data.

Cognitive Growth

Measuring Outcomes of College (Pace 1979) described the literature on the impact of college on the acquisition of knowledge. It presented a wide array of evidence accumulated over the course of many decades and based upon multiple cognitive measures. The results were as we might expect: students learn a lot in college; they learn what they study; and the more they study a subject, the more they learn about it.

Several studies that used the 1972 NLS compared college with

noncollege groups and suggested that college has effects that are distinct from those of maturation. For example, Wolfle (1983) found that postsecondary education was positively related to both vocabulary and mathematics scores when earlier scores, socioeconomic status, and race were held constant. For the sample as a whole, vocabulary increased and mathematics skill decreased, but each year of postsecondary education enhanced performance on both tests. The increment in test score associated with postsecondary education was the same for black and white students.

Institutional Differences

Reviews by Pascarella (1985) and Pascarella and Terenzini (1991) suggested that the influence of differences among institutions on what students learn is much less than the influence of differences among students at the time they enroll. However, it seems that institutions can make a difference. Ayres (1983) found significant differences in performance on the National Teacher Examination (NTE) of students from 15 different North Carolina institutions. SAT scores predicted NTE scores quite well, but if SAT scores were held constant, some significant differences remained among institutions in their students' NTE scores at the time of graduation. Students at some institutions had higher NTE scores than students at other institutions when SAT was held constant. Both black and white students did better at predominantly white than at predominantly black institutions, although there was variation within both groups of schools. For example, results at one largely black school were equivalent to those at several predominantly white schools.

Taking NTE scores with SAT held constant as a measure of institutional effectiveness, Ayres and Bennett (1983) studied the characteristics of the same 15 institutions to try to determine what institutional characteristics are associated with effectiveness. Both selectivity (as reflected in SAT scores and percentage of student body in the top 40 percent of the high school graduating class) and the proportion of faculty with doctorates were found to be strongly associated with institutional differences in NTE scores after SAT scores were accounted for. Of the two factors, faculty qualifications had a somewhat stronger correlation. The authors concluded that an atmosphere of high expectations, set both by the faculty and by student ability and willingness to meet those expectations, is an important

factor in students' learning. This research establishes small but significant institutional differences in cognitive outcomes and suggests that institutional selectivity, expectations, or competitive level may have a positive effect on student learning—at least for those able to meet requirements.

College Graduation

Another important outcome of college attendance is graduation itself. Fortunately, statistics on college graduation are readily available. The probability that a student will graduate from college is affected by a host of factors, however, so that the rate at which students graduate from a particular college does not provide us with a direct index of institutional quality, standards, or effectiveness. The level of student qualifications at the time of entry is one factor that has a major effect on outcomes such as graduation. The experience of students at UIUC in the years when the campus became much more selective provides a clear illustration.

Effect of Student Qualifications

In 1962, the mean UIUC freshman ACT:C was 24, and the mean HSPR was 74. In 1968, these averages had climbed to 26 and 86, respectively. During this period, the first-semester academic drop rate fell from 6 percent to 3 percent and the second-semester drop rate fell from 17 percent to 5 percent. At the same time, the percentage of the freshman class graduating within eight semesters increased from 28 percent to 46 percent; the 10-semester graduation rate climbed from 41 percent to 61 percent. These data are correlational and thus do not permit conclusions about cause and effect. Nonetheless, they suggest that increasing selectivity may have the effect of raising the graduation rate and lowering student vulnerability to academic failure.

Differences in academic qualifications within a freshman class are also associated with different graduation rates. Table 5 displays the percentages of the 1972 UIUC freshmen in business and related majors who graduated within five years. Overall, 63 percent graduated. For those in the highest ACT:C group (31 and above), 78 percent graduated; only 40 percent of those with ACT:C scores below 22 met this criterion of success. HSPR was also related to graduation, with 72

TABLE 5. Rates of Graduation after Five Years for 1972 UIUC Freshmen in Business and Related Majors

ACT:C	*Graduation rate*		*HSPR*
31 and up	78%	72%	90–99
25–30	68	68	80–89
22–24	58	61	70–79
21 and below	40	52	69 and below
Overall	63	63	Overall

percent in the top 10 percent of their high school class (HSPR in the 90s) graduating from UIUC, compared to 52 percent of those with HSPR below 70. These data indicate quite clearly that the probability of a student graduating from college is related to his or her high school record and test score.

Other Factors

Several other factors that affect the graduation rate are clearly evident in data released by the Illinois Board of Higher Education (IBHE) (IBHE 1989). These data displayed graduation rates of students entering Illinois public senior institutions as first-time freshmen in the fall of 1980. Differential graduation rates by type and selectivity of institution and by race of student are evident in Table 6. For the state as a whole, about half (49.3 percent) of all 1980 new freshmen at public four-year institutions graduated within eight years from the same university at which they had first matriculated. However, for black students, this figure was about one-fifth (20.7 percent); for Hispanics it was about one-quarter (26.4 percent); for all other students, it was more than half (54.7 percent).

Black and Hispanic students were very similar to each other in the proportion of graduates taking four, five, six, or more years to graduate, but differed markedly from other students in this respect. The proportion of black and Hispanic graduates who took six years to graduate was 86.5 percent; only 65 percent did so in five years. By comparison, 89 percent of all other graduates completed their degrees within five years. It is clear from these data that four- and five-year graduation rates considerably underestimate the degree attainment of black and Hispanic students. Many of these students

TABLE 6. Graduation Rates from Same Institution within Eight Years of Freshmen Attending Illinois Four-Year Public Colleges in Fall of 1980

	Total	*Black*			*Hispanic*			*All Others*		
Residential	%	*n*	%	ACT:C*	*n*	%	ACT:C*	*n*	%	ACT:C*
Eastern Illinois	53.6%	189	28.0%	14.5	14	50.0%†	15.6	1,885	56.2%	20.8
Western Illinois	39.6	481	17.9	13.9	33	33.3	15.2	2,421	43.9	19.6
Illinois State	56.4	272	30.1	14.2	28	53.6	16.7	3,176	58.7	20.1
Northern Illinois	51.1	350	18.0	14.2	82	39.0	18.1	3,326	54.9	21.7
Southern Illinois, Carbondale	42.9	364	28.0	14.6	25	44.0	16.6	2,098	45.5	21.0
University of Illinois, Urbana-Champaign	73.7	279	47.7	19.0	122	47.5	22.7	5,457	75.6	25.6
All Institutions	56.0	1,935	26.8	15.3 (13.3)	304	44.1	19.5 (17.3)	18,363	59.3	22.5 (20.3)
All Institutions Except UIUC	49.0	1,656	23.3	14.3 (12.7)	182	41.7	17.0 (15.8)	12,906	52.4	20.7 (19.3)
Commuter										
Chicago State	18.3%	465	17.6%	13.0	18	11.1†	10.0	42	28.6%	14.7
Northeastern Illinois	21.7	154	9.1	11.4	207	12.6	12.4	804	26.5	18.2
Southern Illinois, Edwardsville	34.0	218	16.5	14.2	8	37.5†	19.7	1,014	37.8	21.0
University of Illinois, Chicago	27.1	700	9.9	14.9	363	20.1	16.6	2,110	34.1	21.1
All Institutions	26.7	1,537	13.1	13.9 (11.5)	596	17.4	15.4 (11.0)	3,970	33.4	20.5 (17.7)
All Students	49.3		20.7			26.4			54.7	

* ACT:C for those graduating or transferring to and graduating from another four-year institution. (The number in parenthesis is the ACT mean calculated from IBHE data display for those not graduating.)

† Based on total $n < 20$.

Source: Illinois Board of Higher Education, 1989.

apparently need extra time to complete college, but do so given that extra time.

Table 6 also allows comparison of graduation rates at residential and commuter institutions. In general, graduation rates are considerably higher at residential than at commuter institutions. In addition, the rate at UIUC is higher than at the other institutions, as would be expected based on large differences in selectivity. Consequently, the graduation rate was calculated for residential campuses both with and without UIUC data. With UIUC omitted, graduation rates at residential institutions are still considerably higher than those at commuter institutions. For black students this is true even though the ACT means of graduates from the two types of campuses are very close, at 14.3 and 13.9, respectively, and the ACT means of nongraduates are also fairly close, at 12.7 and 11.5, respectively. Hispanic students at residential campuses other than UIUC graduated at a higher rate than the "all others" group at commuter institutions, even though the ACT mean of the former was 17.0, and that of the latter was higher, at 20.5. Attendance at a residential campus appears to be associated with a considerably better chance of graduation. Indeed, Pascarella and Terenzini (1991) concluded that the literature on educational attainment clearly indicates that living on campus, as opposed to commuting, has a strong positive effect, even after control for variables such as academic preparation and socioeconomic status.

Differences Among Ethnic Groups

The IBHE statewide four-year college data indicate the need to take into account factors such as racial composition, residential versus commuter campus, and institutional selectivity in evaluating graduation rates. They also illustrate a very large gap between graduation rates of black and Hispanic students and those of all other students. For residential campuses, the graduation rate of black students is about one-half that of the comparison group; for Hispanic students, the graduation rate is about three-quarters that of the comparison group. Comparisons are even less favorable for commuter campuses. Chapter 2 described the relatively low degree-completion rates of students who begin at two-year colleges, many of which are nonresidential, and the disproportionate number of Hispanic and native American students who enroll at two- rather than four-year institu-

tions. Assisting black and Hispanic students to improve degree-completion rates is an important priority for higher-educational institutions in the years ahead. The relative success of black and Hispanic students at UIUC compared to other public residential four-year colleges in Illinois suggests that selective residential schools should continue to play a large role in these efforts.

Recent UIUC data indicate that black and Hispanic students are now graduating within five years of entry at rates that exceed those of the entire freshman class (which was predominantly white) before the institution became selective. For example, in 1963, when the mean ACT:C was 24 and the mean HSPR was 75, 39 percent of the entering group graduated within five years. By 1983, when overall selectivity was such that the ACT:C and HSPR means were 27 and 89, respectively, 47 percent of the black freshmen and 48 percent of the Hispanic freshmen graduated within five years. These graduation rates exceed overall graduation rates in the years before selective admission, although they still lag behind the overall rate of 75 percent for the entire 1983 entering class. Since we know that many minority students take six years or more to graduate, the percentage graduated or still enrolled after five years is probably a better index of ultimate graduation rate. For the 1983 freshmen, this was 59 percent for black students and 57 percent for Hispanic students. These success rates are close to the five-year overall graduation rates in the late 1960s and early 1970s, which were typically 62 percent, even though, on the average, black and Hispanic freshmen in 1983 were not as well prepared as the average freshman in the earlier decade. Thus, the overall experience of the class, which is related to selectivity, appears to have had a beneficial effect on minority success rates. Pascarella and Terenzini (1991) concluded from their review of the literature that college selectivity has a small, but significant, effect on degree attainment. These findings argue for continued strong recruiting and admission of minority students by selective residential institutions.

Conclusions

This brief overview of some important college outcomes allows several generalizations. Students learn a lot in college, they learn what they study, and they learn more the more they study a subject. Although institutional differences in the knowledge acquired seem to

be small, after the students' preparation levels are taken into account some significant effects have been noted. For example, evidence from North Carolina's public institutions suggests that institutional selectivity, expectations, and competitive level may have a small, but positive, effect on student learning.

Degree attainment, another important college outcome, is a deceptively simple statistic that is readily available, but not always easily interpreted. Just as there is no one correct or ideal set of admission requirements, there is no one rate of graduation to which all institutions should aspire. Although colleges aim to maximize their retention and graduation rates, many factors outside their control come into play; in some cases, a student's decision to drop out of college may actually be the best choice for that student. In addition, degree attainment varies with student qualifications, race, two-year versus four-year college, and residential versus commuter campus. Statistics on retention and graduation rates should be read with these variables in mind. Simple comparisons can be quite misleading, and do not serve as direct evidence concerning institutional effectiveness. At the same time, however, lower rates of degree attainment by black and Hispanic students than by others is a serious problem. This gap will become an even greater problem as these two groups increase in size relative to the population at large, and as postsecondary education becomes even more important for employment. Given the relatively nigh graduation rates of four-year residential campuses compared to those of two-year and commuter institutions, the former institutions must continue to recruit and admit minority students very actively. This applies especially to relatively selective schools, where minority graduation rates tend to be relatively high. Future research needs to focus on factors associated with minority degree attainment, so that postsecondary institutions can assist greater numbers of black and Hispanic students to complete degrees.

6

Determination of Institutional Quality

Academic standards are determined and/or evidenced by the level of academic preparation of the student body, the college curriculum, teaching methods, expectations for learning or grading standards, and achievement levels of graduates. Are these the criteria by which professionals in higher education gauge the quality of institutions and programs? With the exception of grading standards, these do seem to be the typical focal points for quality judgments, at least at the undergraduate level.

Conventional Criteria

In their review of the literature on program quality in higher education, Conrad and Blackburn (1985) noted that reputational studies of graduate programs predominate in the research on quality. Perceived faculty quality is the primary criterion, and the graduate department

is the usual unit. The overall standing of universities in rankings of graduate progams tends to be quite stable over time; essentially the same institutions remain among the top 20. Because their focus is on ranking the top programs, however, most of these studies fail to evaluate other programs, such as those in state and regional colleges and universities. The other major approach to indexing quality is quantitative; the evaluator selects factors such as faculty scholarship and develops quantitative indices, such as articles per year per faculty member, to assess quality. These two types of rankings yield very similar results for graduate programs.

Studies of the quality of undergraduate programs tend to focus on outcome variables, or achievements, such as graduate fellowships and Ph.D.'s awarded to an institution's baccalaureate-degree recipients. Academic selectivity, or the admission qualifications an institution is able to demand based on its popularity with well-prepared students, is also a common index of undergraduate program quality. Astin (1985) noted that liberal arts and sciences and engineering enjoy high prestige, and professional programs such as business and education have lower status. Thus, high-ranked schools tend to have highly qualified students, emphasize the liberal arts and sciences in their curricula, and produce high-achieving graduates.

There is less agreement in the results of different approaches to undergraduate quality rankings than in graduate rankings. For example, when raters are asked to judge the faculty commitment to undergraduate education, small, selective, liberal arts colleges tend to replace research institutions in the hierarchy. As with the graduate rankings, these studies are designed to identify the "top" institutions. Conrad and Blackburn (1985) pointed out the need to develop measures applicable to institutions other than these most elite schools. Finally, they and others (e.g., Astin 1985) note that high-achieving graduates are to be expected from any highly selective program, based solely on selectivity. Studies of the gains associated with attendance, or "value added," could thus be helpful in judging the quality of undergraduate programs.

Talent Development

In *Achieving Educational Excellence,* Astin (1985) argued for a new criterion of institutional excellence—talent development. He points out that the prestige of institutions of higher education is related to

institutional selectivity, family income, and per-student expenditure. Institutions at the top of the prestige hierarchy are mainly selective private universities and four-year colleges, with two-year colleges clustering at the bottom. The traditional views of quality, or excellence, have been based on reputation and resources as evidence of high quality. In this regard, he notes that most of the quantitative indicators of quality in use focus on indices of human and other resources. These include, for example, proportion of faculty with Ph.D.'s, selectivity, number of volumes in the library, size of the endowment, per-student expenditure, and average class size. It is not surprising that resource measures are closely related to reputation, because reputation and resources enhance each other; for example, by admitting a more select group of students, an institution may enhance its reputation. Similarly, as reputation improves, it is easier to attract resources such as excellent students and faculty and private gifts.

Astin argues that these traditional views of excellence are poorly related to students' personal growth. Further, they create inequity by defining excellence in a way that limits its availability. As an alternative, he proposes the development of human talent as a more appropriate measure of quality or excellence in educational institutions. Evaluation based on this criterion would allow institutions to excel without competing with each other, he maintains, and would be equitable because institutions would focus on assisting learning, regardless of the student's initial level of preparation. Currently, reputation and resource "quality" are more available to the affluent and less available to minority group members. Differences in selectivity are closely related to reputation and resources; the lower test scores of minority students tend to track them into the "lesser" schools. As we have seen, minority students, especially Hispanics, are disproportionately represented at two-year colleges, which means that the probability of their attaining the baccalaureate degree is low.

The strengths of Astin's approach include his emphasis on undergraduate education and his focus on teaching and learning as the primary activities, products, and quality measures of higher education. However, it does not follow that an institutional hierarchy based on talent development would necessarily be more equitable than the current hierarchy. Rather, it seems probable that there would be both institutional competition and a hierarchy, regardless of the dimensions on which we judge higher education institutions. In the first place, additional resources, such as excellent teachers, may be needed to

maximize talent development. Teaching talent can be developed, but it is by no means certain that teaching skill can be developed to equally high levels in all individuals who have sufficient knowledge of a subject to teach it. Further, the percentage of the faculty with Ph.D.'s appears to be positively associated with institutional effectiveness; thus the number of Ph.D.'s available—and the shortage that we know is just ahead of us—indicate that resources for talent development are limited. If talent development became our primary means of judging higher educational institutions, institutions would presumably compete to train, hire, and retain the very best teachers available. It seems reasonable to expect that some institutions would excel based on these new criteria, while others would attain more modest success. And students would still want to attend the top-ranked schools, which would still need to find ways to allocate an undersupply of admission spaces to an oversupply of applicants.

Nevertheless, Astin's concept of talent development has much to offer. Certainly, we need to expand the bases on which we judge quality, attending more closely to teaching and to the preparation of teachers in Ph.D. programs. Indeed, the higher education reforms of the 1980s involved greater emphasis on teaching in faculty evaluation and reward, more careful training and supervision of graduate teaching assistants, and greater interest in the search for more effective methods of instruction. The increased importance of the undergraduate teaching-learning process in the evaluation of the quality of individual and institutional performance is a timely counterbalance to a somewhat one-sided emphasis on scholarship. We need to adjust this balance; however, we also need to recognize that at some level resources are critical to quality.

Resources Required for Excellence in Undergraduate Education

Even though indices of institutional quality that are based on resources seem to have only small positive associations with outcomes, maintaining and improving program quality requires a certain level of resources. For example, some desired undergraduate reforms involve relatively high-cost instruction. Foreign languages, writing, and higher-order thinking skills are all best developed in small sections as opposed to large lectures (e.g., Pascarella and Terenzini 1991), and

thus student learning will be related to available resources. Similarly, well-equipped teaching laboratories are resource intensive, and students' opportunities for learning in the sciences especially will be related to institutional resources. Finally, a small, but positive, correlation between the proportion of the faculty with Ph.D.'s and the amount students learn has been noted. In this regard, the future quality of higher education is threatened by a dwindling supply of an important resource—Ph.D.'s.

The overall number of doctoral degrees awarded to U.S. citizens has declined considerably since 1975 (Mingle 1987; Mooney 1991). Fewer degrees have been awarded to black and white Americans than previously; however, the rates for native Americans, Asian Americans, and Hispanic Americans have increased. Doctorates awarded to black and white men have decreased, while the numbers awarded to black and white women have increased (Magner 1989). In fact, women are expected to earn more doctorates than men by 2000 (Nelson 1989). Black, Hispanic, and female degree recipients have all tended to spurn mathematics-intensive fields of study. Even without expected demographic shifts, the decline in males interested in the Ph.D. threatens a reduced pool of people trained to teach and do research in these fields. Shortages of personnel in mathematics and science constitute an increasingly pressing problem if the United States is to retain a competitive position in research and development.

Given the importance of well-trained faculty members to the quality of higher education, these graduate enrollment data are chilling. Higher education cannot expect to maintain its current level of quality unless new faculty are recruited to replace retirees. Schuster and Bowen (1985) found that faculty morale and pay levels were low, and it was becoming hard to attract people into academe. Indeed, the average salaries of faculty members declined from 1972 to 1986 in terms of inflation-adjusted dollars (National Center for Educational Statistics 1988). If we are to maintain the quality to which we have become accustomed, both faculty compensation and also financial assistance for graduate students must be increased.

Assessment of Student Outcomes

Assessment of student outcomes is important if institutional quality is to be judged partly on the basis of a program's effectiveness in assisting student learning. As noted in Chapter 5, assessment of out-

comes is also increasingly serving a function in budget decisions and accountability systems (e.g., Tennessee's use of indices of improved outcomes as a basis for increasing funding of postsecondary institutions). Some student outcome measures have been mandated as efforts to ensure a certain level of learning (e.g., examinations required in Florida before sophomores can become juniors) and thus function as minimum-competency-testing programs. In short, measures of student learning have been proposed to serve multiple purposes which are not always mutually compatible. These include feedback to help the individual student learn, feedback to help the instructor guide classroom activities, feedback to assist the department in improving programs, program monitoring at other levels within the institution, information to state agencies for accountability and funding purposes, gatekeeping decisions (pass/fail) concerning individual student progress, feedback to assist high schools and community colleges to evaluate programs, and information to assist the public in evaluating institutional quality.

Multiple measures are generally proposed to assess college outcomes, rather than attempting to provide the information needed by students, teachers, and others through a single test or measurement (see, for example, Vandament 1987). In theory, the use of multiple measures could allow outcome assessment to serve well all of the multiple purposes for which it is proposed. However, it is very unlikely that assessments imposed at the state or system level will serve very many of these purposes adequately, even using multiple measures. For example, to be of use in the teaching-learning process, feedback for students and instructors has to be tied very directly to what is going on in a particular classroom. Feedback intended to improve programs must be program specific. Curricula vary quite a bit within institutions as well as among institutions. Centrally imposed assessment mechanisms are not likely to fit the needs of programs, students, or instructors.

Concern that college programs could become slanted toward minimum competencies measured predominantly by multiple-choice examinations, to the detriment of the development of higher-order thinking skills, is a reasonable reaction to overly prescriptive outcome evaluation. We have seen that such testing programs, when imposed within elementary and secondary schools, have had negative consequences on instruction and have yielded reported student achievement levels that are spuriously elevated as a result of teaching to the

particulars of the test rather than providing broader coverage of the content area.

Student learning, like undergraduate education, should receive greater attention than it has in the immediate past. However, to be most useful, evaluation of student learning must be decentralized. Measures must be selected by the appropriate people, and at the organizational level where changes can most effectively be made, that is, by faculty members operating within academic departments. To improve learning, assessment must continue to be a regular part of the evaluation and feedback processes of faculty members, departments, and institutions. Although visibility, comparability, and quick accountability may suffer as a result of this decentralized approach, the instructional program—and the students in it—will benefit.

7

Conclusions

This review of academic standards at the point of admission to higher education, in the development of the overall curriculum, in the communication of expectations to students, in grading, and in the achievement levels of graduates has served to underscore the diversity that is a hallmark of U.S. higher education. Just as there is no one entering achievement level required of all students, no one curriculum would suit the interests and educational background of all. Similarly, we know that both selectivity and outcomes vary among institutions. Thus, we have a diversity of standards in higher education. And, indeed, this is an appropriate state of affairs in a nation that seeks to provide access to postsecondary education to all who seek it (see, for example, Trow 1988). Within a system of higher education that has a multitude of differing standards for entry, content, grading, and certification, it is important that we further our understanding of what educational approaches work best with different students. Determining what kinds of institutional environments, programs, and instructional methods are associated with the greatest cognitive gains for specific kinds of students should be high on our research agenda (see,

for example, Pascarella 1985). It seems unlikely that any one institution can serve every student group equally well, but we need to understand how institutions can best specialize in order to improve the overall quality of service to students.

Effects of Change

At the same time that we place a higher priority on research concerning student learning, we should also pay close attention to the effects of change. Too often, political pressures on the educational system have led to demands for actions that lack empirical support or that even run counter to research findings. One example is the current popularity of grade-promotion standards based on a minimum level of academic achievement, with a prohibition against "social" promotions. Although this appears to ensure high academic standards, considerable data suggest that grade retention is at best ineffective, and probably even detrimental to academic achievement. Grade retention (being left back) is apparently correlated with later dropping out, even when achievement is held constant. In fact, grade retention may lower achievement and increase the dropout rate both as a result of lowered achievement and through the effect of nonpromotion itself on dropout (Shepard and Smith 1989). Thus, the research evidence is contrary to the popular wisdom concerning grade retention and "social" promotion.

Atkin (1985) made a similar argument concerning educational change. He pointed out that the public tends to focus on one issue, such as minimum competency, without paying sufficient attention to the whole system. The schools respond, but some unintended effects occur. For example, concurrent with increased effort toward improving performance of low-achieving students, the performance of high achievers slipped. In a period of increased assertiveness by legislatures and state boards, it is especially important that we try to keep the whole system in focus and study the results of existing programs before implementing them more broadly. Otherwise, we may unwittingly work against the achievement of our goals. Furthermore, not only are we sometimes ignorant of the results of existing programs, but the causes of known results may be unknown as well. For example, we do not know the reasons for the recent gains in minority test scores and are in the anomalous position of wanting to protect a

trend whose causes are not clear (Koretz 1987). Considerably more applied research is required.

Minority Groups

Education of minority students—especially black and Hispanic students—must receive more focused attention if students from these groups are to have a fair chance to complete the education that will be increasingly necessary in order to contribute to the health of the economy and to earn a living wage. We must continue to encourage greater participation by these students in high-quality college-preparatory high school programs, to recruit them into higher educational institutions, and to support them academically and financially while enrolled. Especially for Hispanic students, residential campuses, where degree-completion rates are higher than on commuter campuses, need to become more aggressive in these efforts. Selective institutions, where graduation rates are relatively high, have a special role to play, as well. Finally, financial aid programs need attention, in part because many minority students require more than five years—the cutoff for most aid programs—to graduate.

Outlook for the Future

As we enter a period during which institutions must compete more aggressively for students, but students need not compete so aggressively for admission, higher educational institutions need to ensure that their review of admission credentials continues to guide students appropriately. High school course work requirements should be continued, as should collaborative high school–college efforts aimed at enhancing the quality of courses and curricula offered. Selective schools as a group could set an appropriate tone if more of them were to use challenging achievement tests in the admission process.

Within higher education, the pendulum has recently swung toward more clearly articulated institutional responsibility for general education, with reduced priority given to serving individual departmental interest in the major. Concurrently, we find a heightened concern for the quality of undergraduate instruction, which is significant, healthy, and likely to lead to some real improvements in the quality of undergraduate programs. However, some of the improve-

ments that are of greatest interest, e.g., more attention to writing, more widespread study of foreign languages and cultures, more laboratory science, etc., will raise the net cost of instruction by substituting some smaller classes for larger ones. As disciplines focus on the effectiveness of alternative instructional methods and find methods that are more effective for the teaching and learning of particular subject matter, it is likely that some of the results will, like the Treisman workshop approach to mathematics, involve relatively high-cost, small-group instruction. Some of these changes will be necessary if we are to meet our need for more people trained in mathematics and the sciences. If significant new resources are not available for these purposes, the magnitude of change that is possible will be considerably reduced, however. Similarly, new resources are needed to attract students into Ph.D. programs and to make college teaching a more attractive field.

We have seen that just as students differ widely in their past accomplishments as they enter higher education, so, too, do they differ markedly in achievement at the point of exit. Some outcomes are related to preparation levels at entry. The graduation rate is related to the admission selectivity of a program, but there are also institutional effects that go beyond this. For example, graduation rates are higher at residential than at commuter schools. More study of student growth, or talent development (Astin 1985), is needed in order to understand the factors that are associated with the effectiveness of programs. The level at which such study is likely to be most useful, however, is not the level at which outcome assessment is most typically encouraged. That is, results of teaching methods are most likely to be fruitfully studied at the course or department level. Since programs within an institution vary, assessments that are institutionwide, much less systemwide, are unlikely to be effective means of furthering our understanding of the factors that enhance student learning. Furthermore, large-scale testing programs are likely to focus on fairly low-level objectives, and on factors that are relatively easy to test. Statewide or systemwide outcome measures should be avoided, and increased attention given instead to the setting of expectations and measurement of results within programs and individual institutions.

It should be clear from this discussion of academic standards in higher education that although we are all in favor of setting and maintaining high academic standards, the issues involved are tremendously complex. The focus in discussing standards needs to move

from the global to the particular, in recognition of the fact that ultimately it is student learning within specific programs that is important. At the extremes, the emphasis should shift from statewide testing programs using common measures for all students and programs toward investigations of the instructional methods that can best help students of a particular background master one particular content area. It is at this level that we can with reasonable precision talk about, set, maintain, or enhance academic standards—which ultimately have to do most importantly with what students learn.

References

Airasian, P. W. 1988. "Measurement-Driven Instruction: A Closer Look." *Educational Measurement: Issues and Practice* 7(Winter): 6–11.

American Council on Education. 1991. *Minorities in Higher Education: Ninth Annual Status Report.* Washington, D.C.: American Council on Education.

Amherst College Faculty. 1827. *The Substance of Two Reports of the Faculty of Amherst College to the Board of Trustees with the Doings of the Board Thereon.* Amherst: Carter & Adams—Printers.

Applebee, A. N., J. A. Langer, and I. V. S. Mullis. 1989. *Crossroads in American Education.* Princeton: Educational Testing Service.

Association of American Colleges. 1985. *Integrity in the College Curriculum: A Report to the Academic Community.* Washington, D.C.: Association of American Colleges.

Association of American Colleges. 1991. *Liberal Learning and the Arts and Sciences Major.* Washington, D.C.: Association of American Colleges.

Astin, A. W. 1985. *Achieving Educational Excellence.* San Francisco: Jossey-Bass.

Astin, A. W. 1987. "Assessment, Value-Added, and Educational Excellence." In *Student Outcomes Assessment: What Institutions Stand to Gain,* edited by D. F. Halpern. *New Directions for Higher Education* no. 59: 89–107.

References

Atkin, J. M. 1985. "Changing Our Thinking about Educational Change." In *Challenge to American Schools: The Case for Standards and Values*, edited by J. H. Bunzel. Oxford: Oxford University Press: 47–60.

Ayres, Q. W. 1983. "Student Achievement at Predominantly White and Predominantly Black Universities." *American Educational Research Journal* 20(Summer): 291–304.

Ayres, Q. W., and R. W. Bennett. 1983. "University Characteristics and Student Achievement." *The Journal of Higher Education* (Sept/Oct): 516–532.

Banta, T. W., and M. S. Moffett. 1987. "Performance Funding in Tennessee: Stimulus for Program Improvement." In *Student Outcomes Assessment: What Institutions Stand to Gain*, edited by D. F. Halpern. *New Directions for Higher Education* no. 59: 35–43.

Bennett, W. J. 1984. *To Reclaim a Legacy: A Report on the Humanities in Higher Education*. Washington, D.C.: National Endowment for the Humanities.

Boyer, E. L. 1987. *College: The Undergraduate Experience in America*. New York: Harper & Row.

Breland, H. M., G. Wilder, and N. J. Robertson. 1986. *Demographics, Standards, and Equity: Challenges in College Admissions*. Washington, D.C.: AACRAO.

Cieresko, A. A. 1987. "Mandated Testing in Florida: A Faculty Perspective." In *Student Outcomes Assessment: What Institutions Stand to Gain*, edited by D. F. Halpern. *New Directions for Higher Education* no. 59: 67–73.

Coley, R. J., and M. E. Goertz. 1990. *Educational Standards in the 50 States, 1990*. Princeton: Educational Testing Service.

College Board. 1983. *Academic Preparation for College: What Students Need to Know and Be Able to Do* [the Green Book]. New York: College Entrance Examination Board.

College Board. 1989a. *Educational EQuality Project, Internal Self-Study: 1980–1989*. New York: College Entrance Examination Board.

College Board. 1989b. "Number and Type of Courses Taken Strongly Linked to SAT Scores for Students in High School Class of 1989." *The College Board News* 18(1), 1.

Conrad, C. F., and R. T. Blackburn. 1985. "Program Quality in Higher Education: A Review and Critique of Literature and Research." In *Higher Education: Handbook of Theory and Research, 1*, edited by J. C. Smart. New York: Agathon Press: 283–308.

Davis, J. D. 1986. *The Effects of Mathematics Course Enrollment on Racial/Ethnic Differences in Secondary School Mathematics Achievement*. Princeton: Educational Testing Service.

80

References

Educational Testing Service. 1989. *A World of Differences—An International Assessment of Mathematics and Sciences.* Princeton: Educational Testing Service.

Elliott, R., and A. C. Strenta. 1989. "The Case for the SAT in College Selection: Critique of Crouse and Trusheim's *The Case Against the SAT.*" Paper presented at the annual meeting of the American Educational Research Association, San Francisco, March.

Ellwein, M. C., and G. V. Glass. 1989. "Ending Social Promotion in Waterford: Appearances and Reality." In *Flunking Grades: Research and Policies on Retention,* edited by L. A. Shepard and M. L. Smith. London: Falmer Press.

Ellwein, M. C., G. V. Glass, and M. L. Smith. 1988. "Standards of Competence: Propositions on the Nature of Testing Reforms." *Educational Researcher* 17(Nov): 4–9.

Gaff, J. 1988. "Reforming Undergraduate General Education." *Liberal Education* 74(5): 4–10.

Goldman, R. D., and M. H. Widawski. 1976. "A Within-Subjects Technique for Comparing College Grading Standards: Implications in the Validity of the Evaluation of College Achievement." *Educational and Psychological Measurement* 36:381–390.

Halpern, D. F. 1987. "Student Outcomes Assessment: Introduction and Overview." In *Student Outcomes Assessment: What Institutions Stand to Gain,* edited by D. F. Halpern. *New Directions for Higher Education* no. 57: 5–8.

Harrington, P. E., and A. M. Sum. 1988. "Whatever Happened to the College Enrollment Crisis?" *Academe* 74(Sept/Oct): 17–22.

Hoyt, K. B. 1988. "The Changing Workforce: A Review of Projections—1986 to 2000." *The Career Development Quarterly* 37(Sept): 31–39.

Illinois Board of Higher Education. 1989. "Retention and Graduation Patterns at Illinois Public Universities." Agenda item #6, September 6.

Jaeger, R. M. 1987. "Two Decades of Revolution in Educational Measurement?" *Educational Measurement: Issues and Practices* 6(Winter): 6–14.

Jencks, C., and J. Crouse. 1982. "Should We Relabel the SAT . . . or Replace It?" *Phi Delta Kappan* 63(June): 659–663.

Jones, L. V., E. C. Davenport, and A. Bryson. 1986. "Mathematics and Science Test Scores as Related to Courses Taken in High School and Other Factors." *Journal of Educational Measurement* 23(Fall): 197–208.

Keimig, R. T. 1983. *Raising Academic Standards: A Guide to Learning Improvement.* ASHE-ERIC Higher Education Report No. 4. Washington, D.C.: Association for the Study of Higher Education.

Kirst, M. W. 1985. "The Impact of Postsecondary Admission Policies on Secondary Education." *Educational Leadership* 41(Oct): 16.

Klitgaard, R. 1985. *Choosing Elites.* New York: Basic Books.

Koretz, D. 1986. *Trends in Educational Achievement.* Washington, D.C.: Congressional Budget Office.

Koretz, D. 1987. *Educational Achievement: Explanations and Implications of Recent Trends.* Washington, D.C.: Congressional Budget Office.

Koretz, D. M., R. L. Linn, S. B. Dunbar, and L. A. Shepard. 1991. "The Effects of High-Stakes Testing on Achievement: Preliminary Findings about Generalizations across Tests." Paper presented at the annual meeting of the American Educational Research Association, Chicago, April.

Lauter, P. 1983. "Race and Gender in the Shaping of the American Literary Canon: A Case Study from the Twenties." *Feminist Studies* 9(3): 435–463.

Leatherman, C. 1989. "High school students found taking more core-curriculum courses." *Chronicle of Higher Education,* XXXV(August 2), A2.

Levine, A. 1986. "Deja Vu: Reviewing Educational Reports from the Past." *Change* 18(Jan/Feb): 50–52.

Levine, S. 1984. "College Admission Requirements and the High School Program." *NASSP Bulletin* 68(Oct): 19–25.

Linn, R. L. 1991. "Examinations: Validity, Comparability, and Consequences." Paper presented at the annual meeting of the American Educational Research Association, Chicago, April.

Linn, R. L., and S. B. Dunbar. 1990. "The Nation's Report Card Goes Home: Good News and Bad about Trends in Achievement." *Phi Delta Kappan* 72(October): 127–133.

Loeb, J. W. 1982. "Evaluating the Validity and Equity of Standardized Tests." In *College Admission Counseling,* edited by W. R. Lowery. San Francisco: Jossey-Bass: 528–548.

Maeroff, G. I. 1983. *School and College, Partnerships in Education.* Princeton: Carnegie Foundation for the Advancement of Teaching.

Magner, D. K. 1989. "Decline in Doctorates Earned by Black and White Men Persists, Study Finds; Foreign Students and U.S. Women Fill Gaps." *Chronicle of Higher Education* XXXV(March 1), A11.

McCord, M. T. 1985. "Methods and Theories of Instruction." In *Higher Education: Handbook of Theory and Research, I,* edited by J. C. Smart. New York: Agathon Press: 97–131.

McCreary, P. R., and A. L. Peressini. 1990. Personal communication.

McPherson, Michael S., and Morton Owen Schapiro. 1990. *Selective Admission and the Public Interest.* New York: College Entrance Examination Board.

References

Mingle, J. R. 1987. *Focus on Minorities: Trends in Higher Education Participation and Success.* Denver: Education Commission of the States and State Higher Education Executive Officers.

Mooney, C. J. 1991. "Universities Award Record Number of Doctorates; More than 25% Go to Students from Overseas." *Chronicle of Higher Education* XXXVII(May 29): A1.

Mullis, I. V. S., E. H. Owen, and G. W. Phillips. 1990. *Accelerating Academic Achievement.* Princeton: Educational Testing Service.

National Center for Educational Statistics. 1988. *The Condition of Education, 2.* Washington, D.C.: National Center for Educational Statistics.

National Commission on Higher Education Issues. 1982. *To Strengthen Quality in Higher Education.* Washington, D.C.: American Council on Education.

National Institute of Education Study Group on the Conditions of Excellence in American Higher Education. 1984. *Involvement in Learning: Realizing the Potential of American Higher Education.* Washington, D.C.: National Institute of Education.

National Research Council. 1989. *Everybody Counts: A Report to the Nation on the Future of Mathematics Education.* Washington, D.C.: National Academy Press.

Nelson, W. D. 1989. "Women to Get Most Doctorates, Study Says." *Chicago Sun-Times,* December 28.

Pace, R. 1979. *Measuring Outcomes of College.* San Francisco: Jossey-Bass.

Pascarella, E. T. 1985. "College Environmental Influences on Learning and Cognitive Development: A Critical Review and Synthesis." In *Higher Education: Handbook of Theory and Research, I,* edited by J. C. Smart. New York: Agathon Press: 1–61.

Pascarella, E. T., and P. T. Terenzini. 1991. *How College Affects Students.* San Francisco: Jossey-Bass.

Perkins, M. R. 1982. "Minimum Competency Testing: What? Why? Why Not?" *Educational Measurement: Issues and Practice* 1(Winter): 5–9.

Pipho, C. 1989. "Tomorrow's Math and Science." *Education Week,* VIII(June 14): 30.

Popham, W. J. 1987. "The Merits of Measurement-Driven Instruction." *Phi Delta Kappan* 68(May): 679–682.

Professional Preparation Network. 1988. *Strengthening the Ties that Bind: Integrating Undergraduate Liberal and Professional Study.* Ann Arbor: University of Michigan.

Resnick, L. B. 1991. "Examinations and Learning." Paper presented at the annual meeting of the American Educational Research Association, Chicago, April.

References

Resnick, D. P., and L. B. Resnick. 1985. "Standards, Curriculum, and Performance: A Historical and Comparative Perspective." *Educational Researcher* 14(April): 5–20.

Schuster, J. H., and H. R. Bowen. 1985. "The Faculty at Risk." *Change* 17(Sept/Oct): 13–21.

Shepard, L. A., and K. C. Dougherty. 1991. "Effects of High-Stakes Testing on Instruction." Paper presented at the annual meeting of the American Educational Research Association, Chicago, April.

Shepard, L. A., and M. L. Smith, eds. 1989. *Flunking Grades: Research on Policies on Retention.* London: Falmer Press.

Strenta, A. C., and R. Elliott. 1987. "Differential Grading Standards Revisited." *Journal of Educational Measurement* 24(Winter): 281–291.

Thomas, G. E. 1986. *The Access and Success of Blacks and Hispanics in U.S. Graduate and Professional Education.* Washington, D.C.: National Academy Press.

Treisman, P. U. 1985. *A Study of the Mathematics Performance of Black Students at the University of California, Berkeley.* Berkeley: University of California (doctoral dissertation).

Trow, M. 1986. "The National Reports on Higher Education: A Skeptical View." Revision of a paper presented to the faculty seminar on "Ideas of the University," Southern Methodist University, Dallas, March.

Trow, M. 1988. "American Higher Education Past, Present, and Future." *Educational Researcher* 17(April): 13–23.

Tucker, M. 1991. "National Examinations and the Education Reform Agenda." Paper presented at the annual meeting of the American Educational Research Association, Chicago, April.

Vandament, W. I. 1987. "A State University Perspective on Student Outcomes Assessment." In *Student Outcomes Assessment: What Institutions Stand to Gain,* edited by D. F. Halpern. *New Directions for Higher Education* no. 59: 25–28.

Watkins, B. T. 1989. "Many Campuses Now Challenging Minority Students to Excel in Math and Science." *Chronicle of Higher Education* XXXV(June 14): A13.

Wayland, F. 1842. *Thoughts on the Present Collegiate System in the United States.* Boston: Gould, Kendall, & Lincoln.

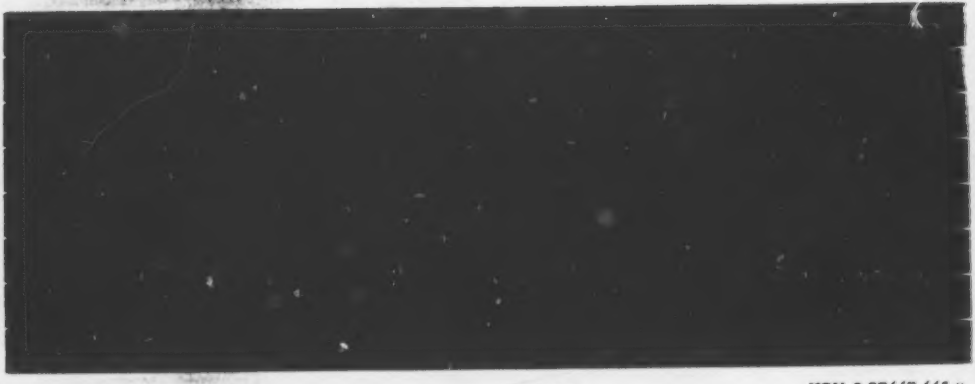
Wharton, C. R., Jr. 1988. "Public Higher Education and Black Americans: Today's Crisis, Tomorrow's Disaster." In *Minorities in Public Higher Education: At a Turning Point.* Washington, D.C.: American Association of State Colleges and Universities Press: 3–20.

Wolfle, L. M. 1983. "Effects of Higher Education on Achievement for Blacks and Whites." *Research in Higher Education* 19(1): 3–9.

References

Yale College Faculty and Committee of the Corporation. 1828. *Report on the Course of Instruction at Yale College.* New Haven: Hezekiah Howe.

Zemsky, R. 1989. *Structure and Coherence: Measuring the Undergraduate Curriculum.* Philadelphia: University of Pennsylvania.



BEST COPY AVAILABLE

ISBN: 0-87447-445-0
004450